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King et al.

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(45) **Date of Patent: May 21, 2013**

(54) **CARTRIDGE-TYPE DISPENSER**

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PCT Pub. Date: **Jan. 3, 2008**

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B01D 11/02 (2006.01)

(52) **U.S. Cl.**
USPC **422/261**; 222/207

(58) **Field of Classification Search**
USPC 422/261, 430, 547, 552, 569; 53/410, 53/423; 222/164, 165, 207
See application file for complete search history.

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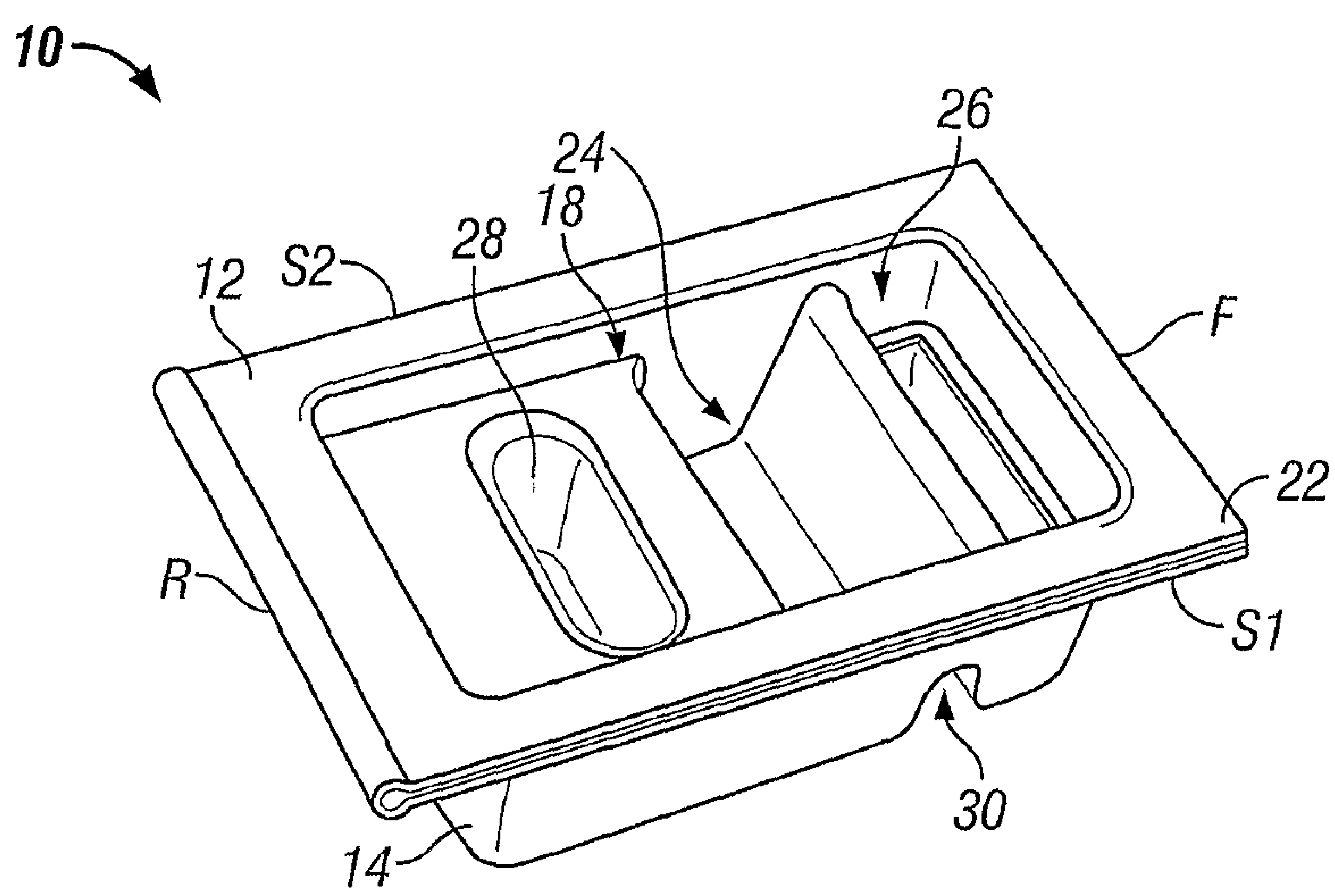
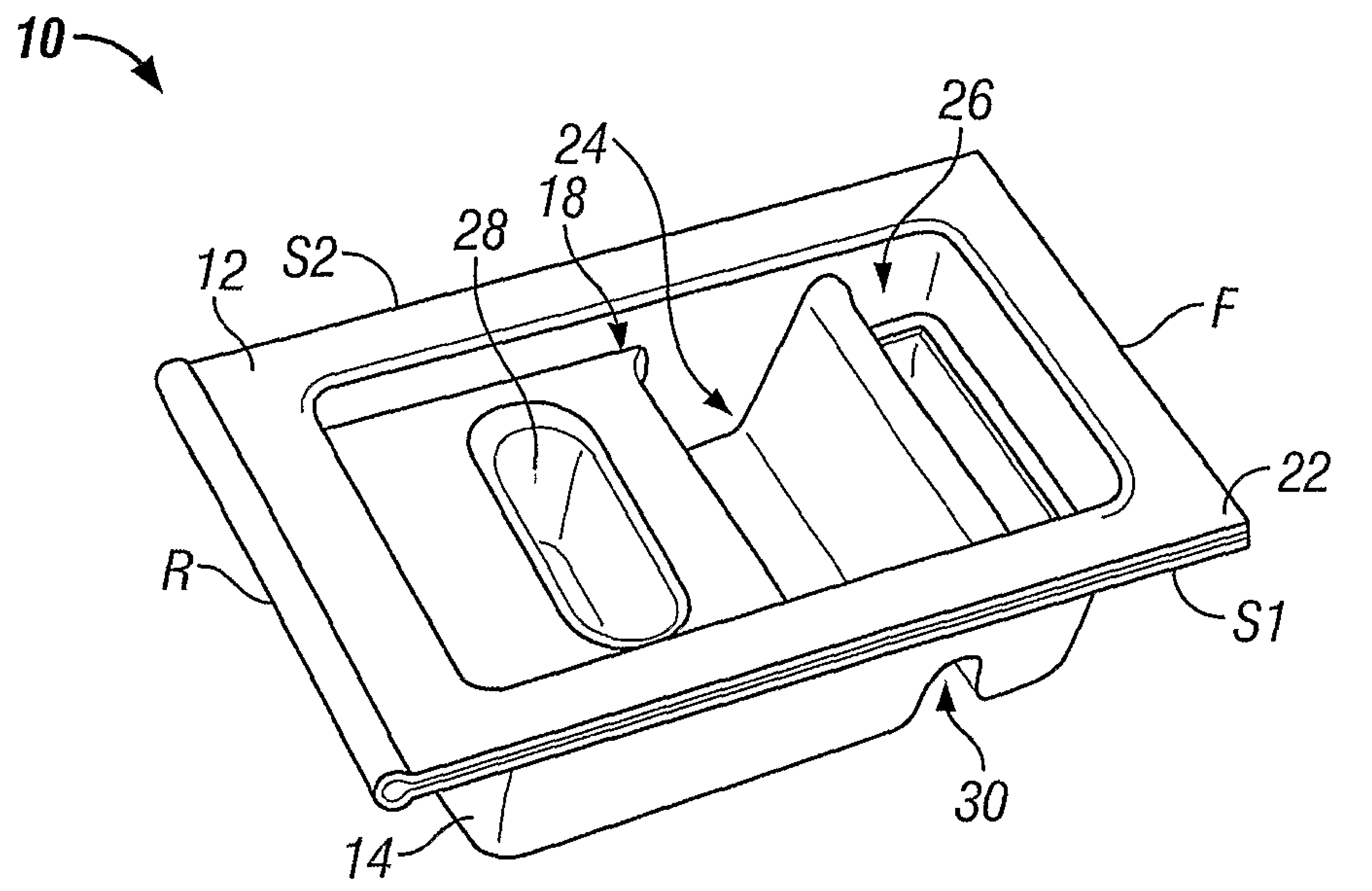
(74) *Attorney, Agent, or Firm* — Norris McLaughlin & Marcus PA

(57) **ABSTRACT**

The present invention relates to improved cartridge-type dispenser for a chemical treatment composition which, when contacted with water or other liquid will at least partially dissolve or disperse, and thereby elute one or more chemical compounds to the water or other liquid. The improved cartridge-type dispense may be used itself, or in conjunction with a further apparatus.

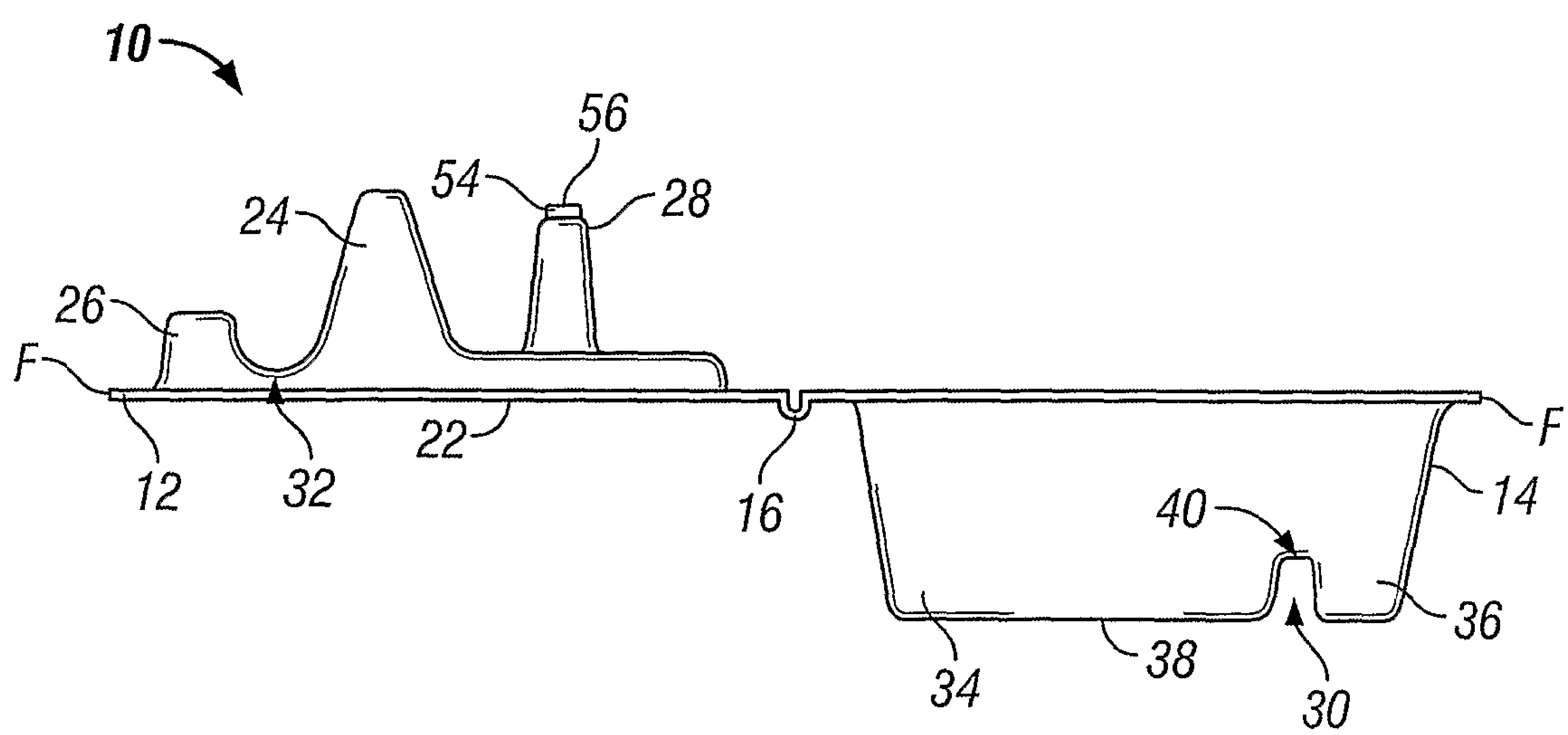
5 Claims, 16 Drawing Sheets





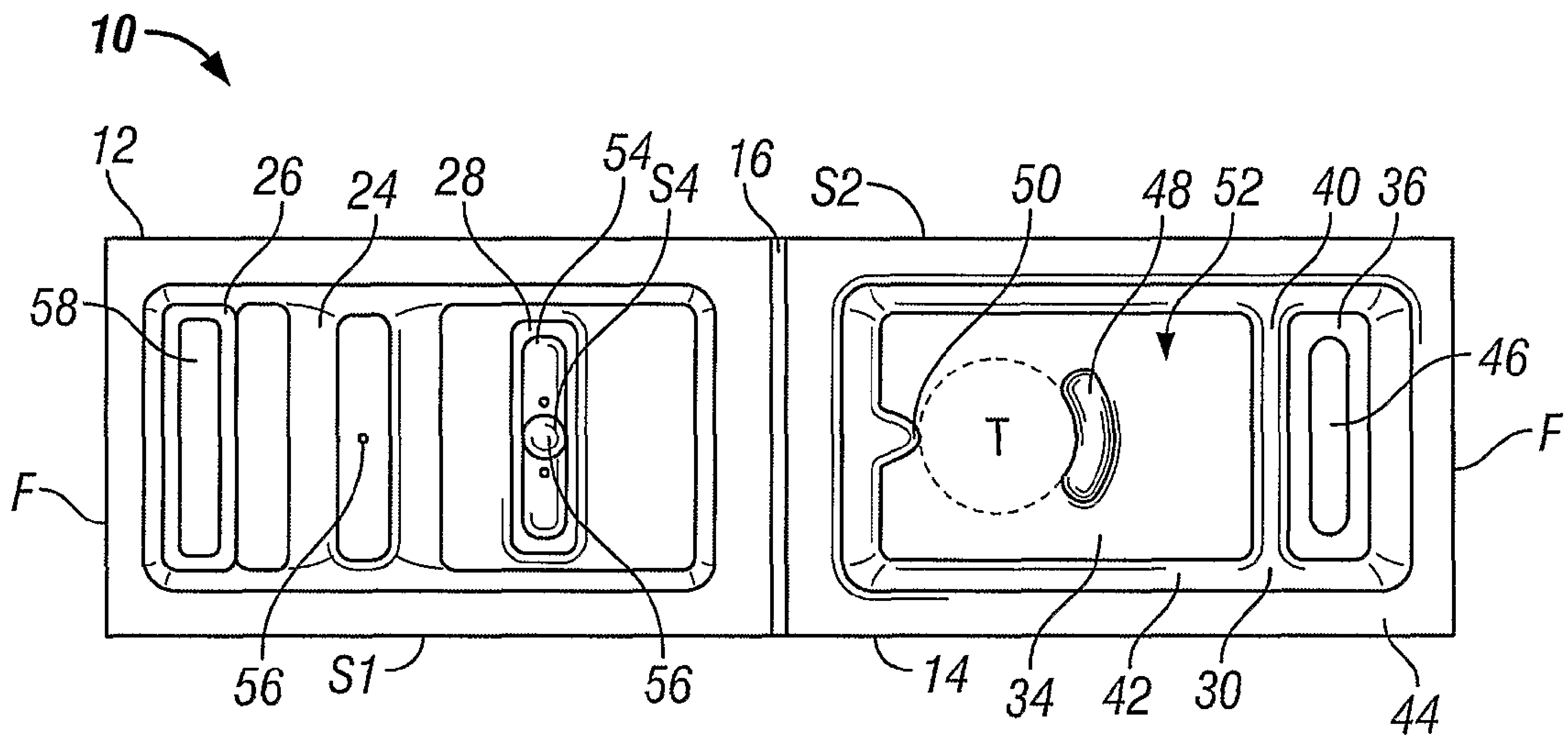
10
26
24
18
28
12
S2
F
22
R
S1
30
14

FIG. 1



10
56
54
28
24
26
F
12
32
22
16
F
14
40
36
34
38
30

FIG. 2


10
12
26
24
28
54
S4
16
S2
50
48
52
40
36
58
46
F
T
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56
S1
56
14
34
42
30
44

FIG. 3

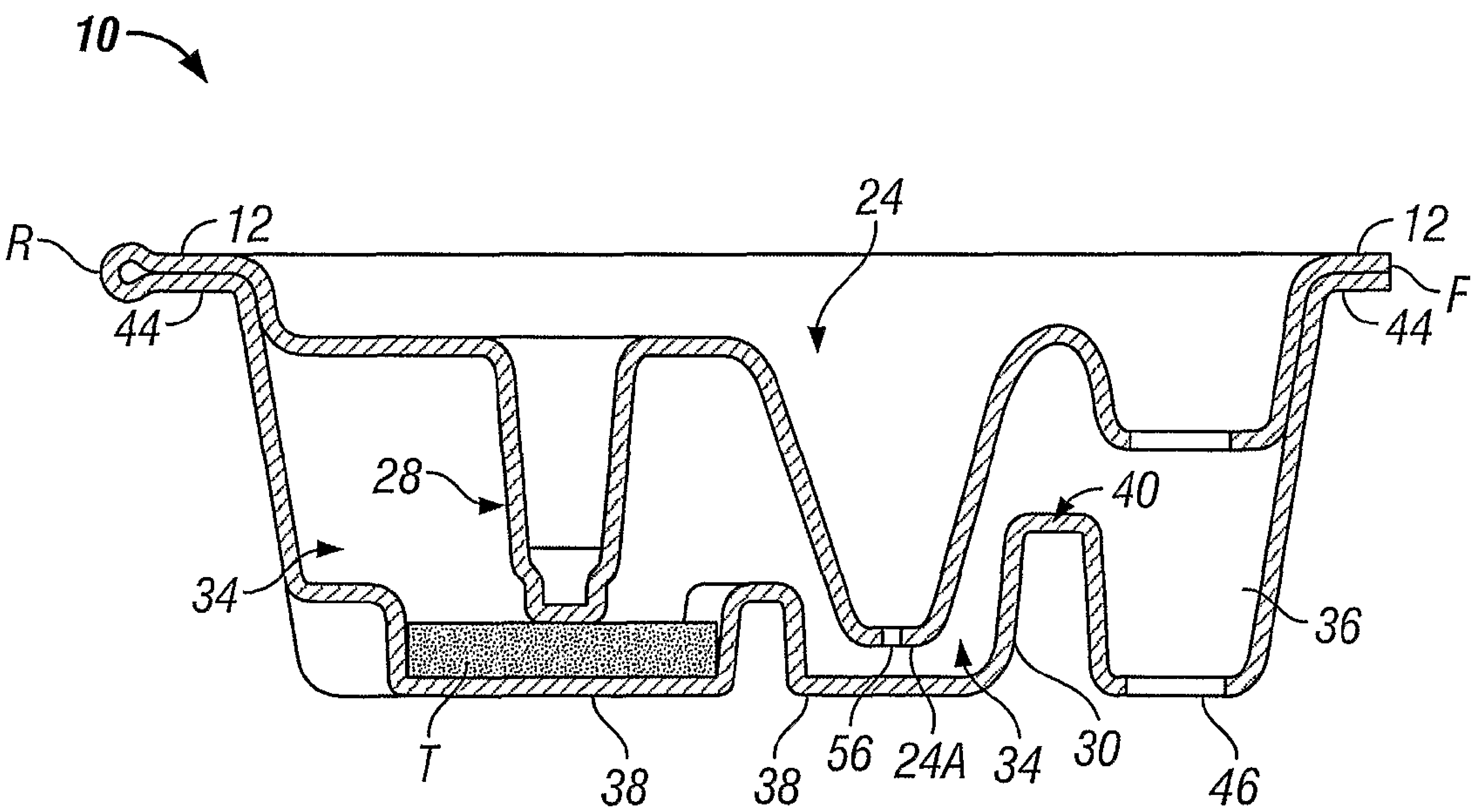
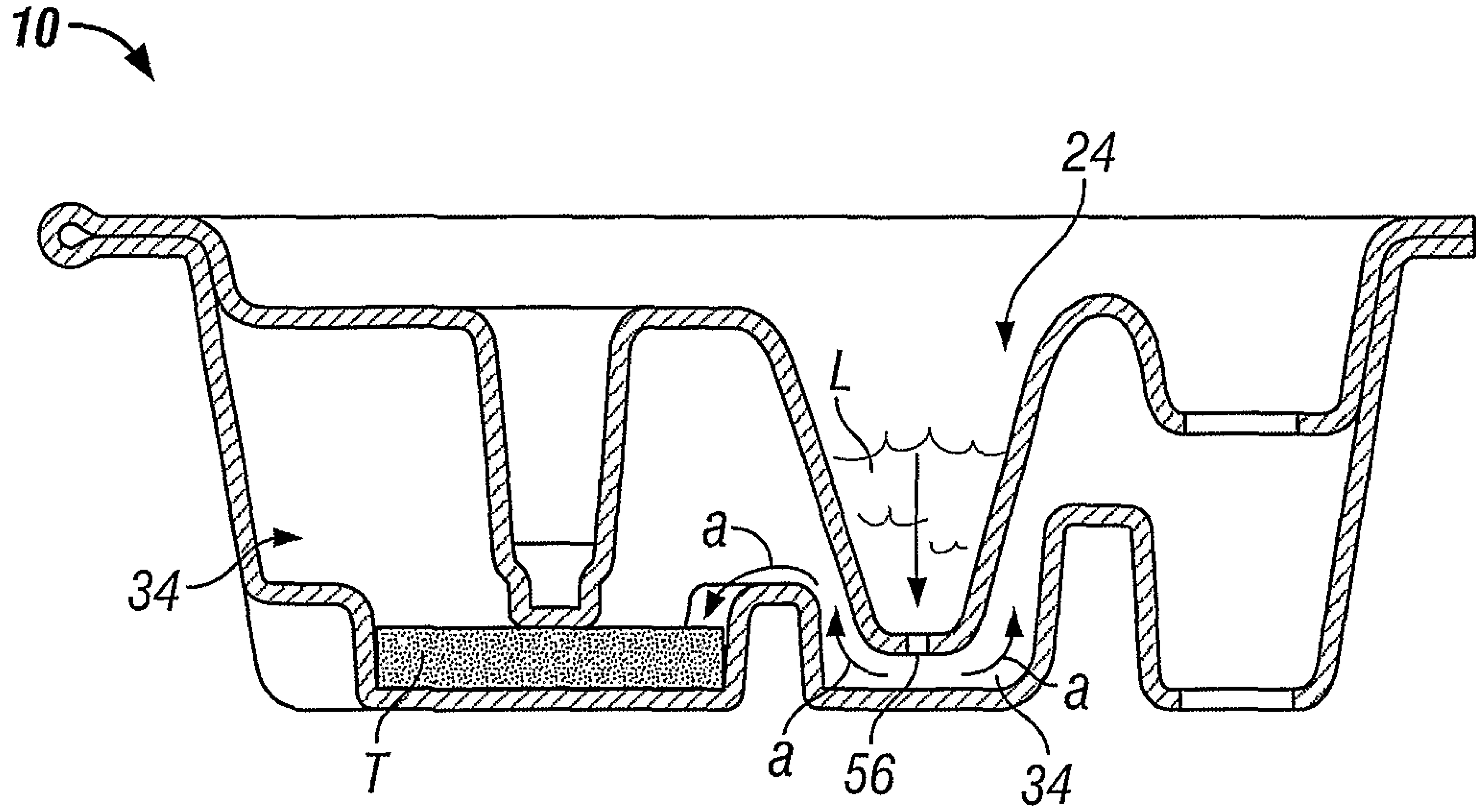

10
24
R
12
12
F
44
44
28
40
34
36
T
38
38
56
24A
34
30
46

FIG. 4



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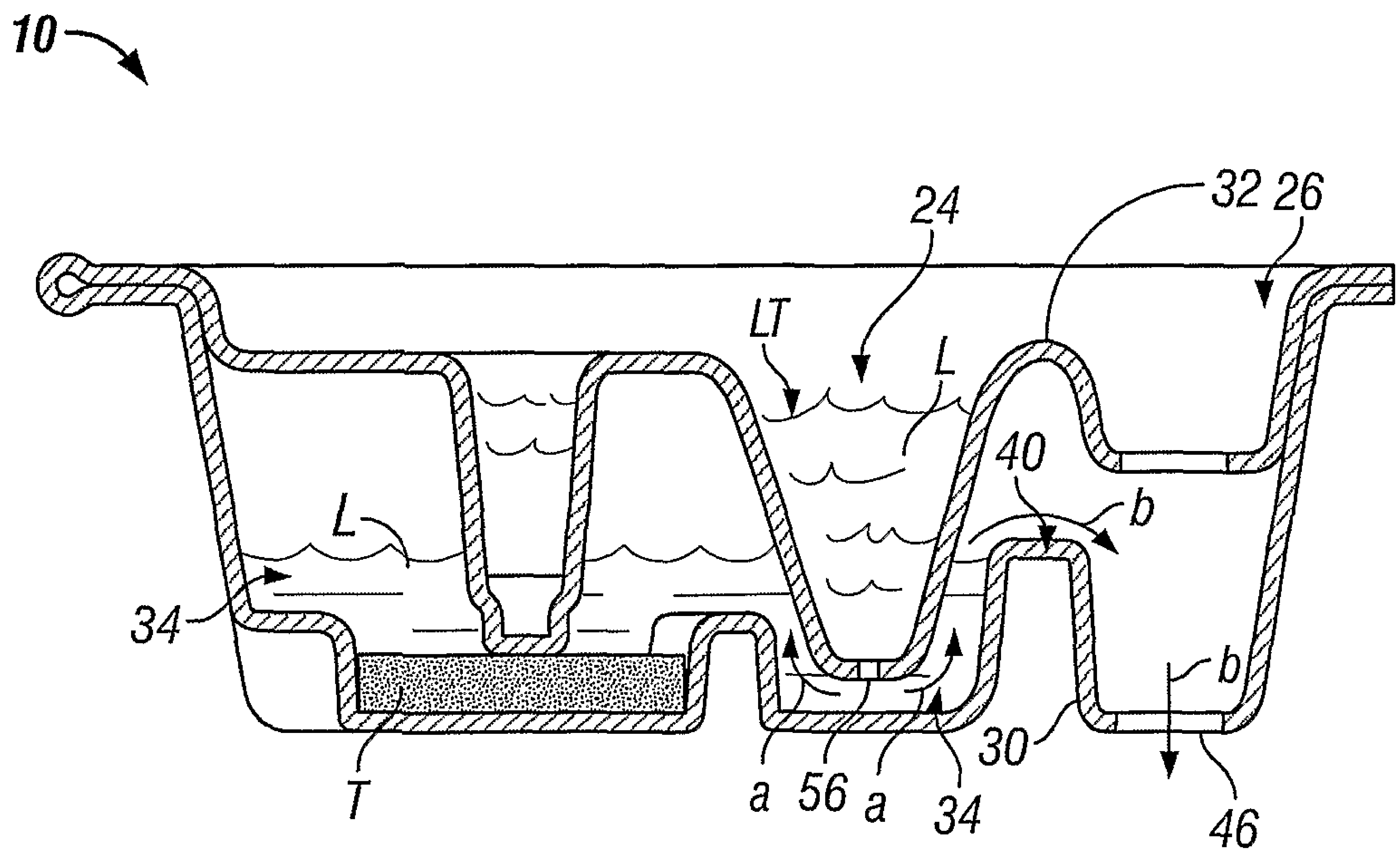


FIG. 6

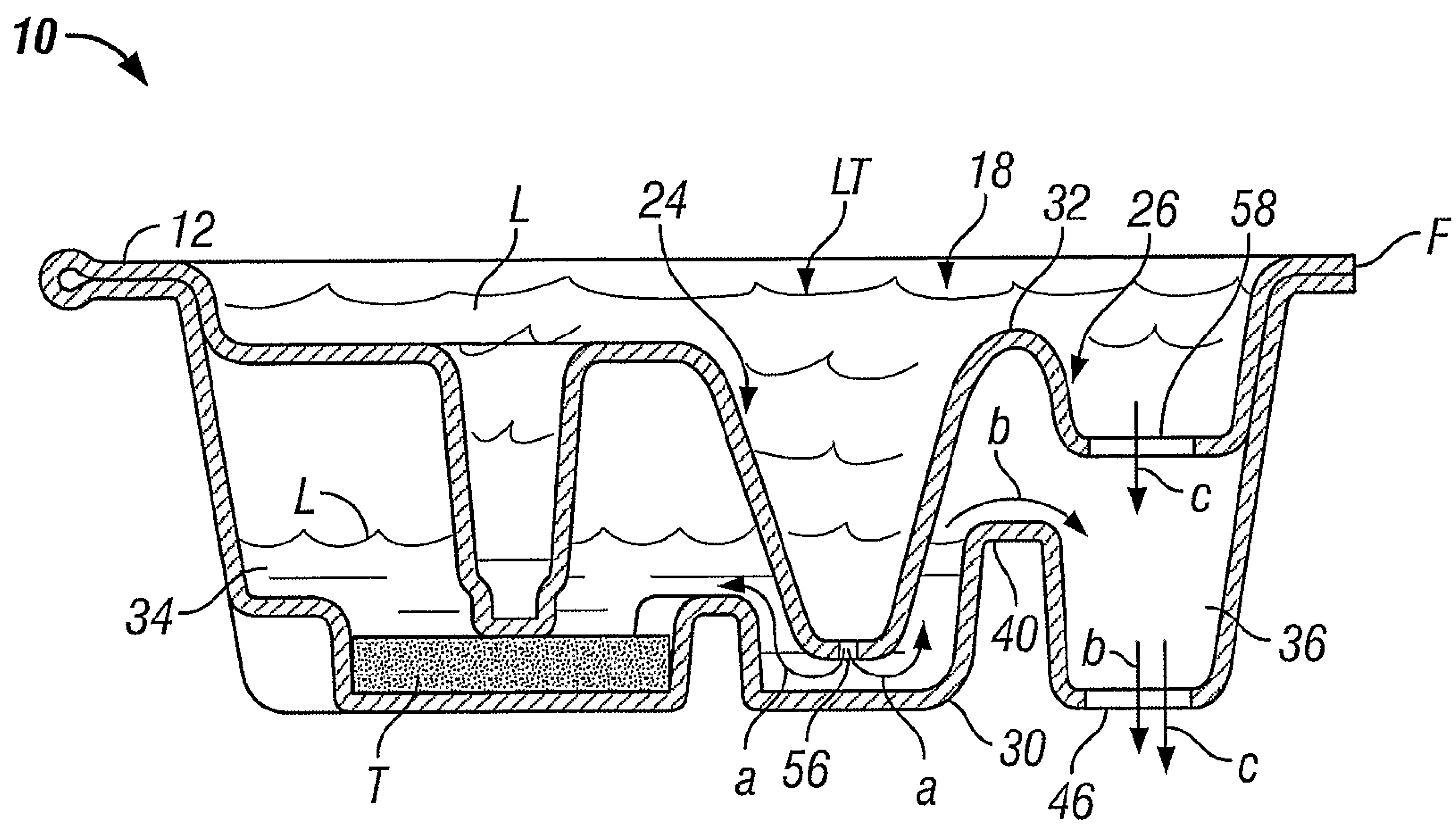

10
12
L
24
LT
18
32
26
58
F
b
c
L
34
40
36
b
T
a
56
a
30
46
c

FIG. 7

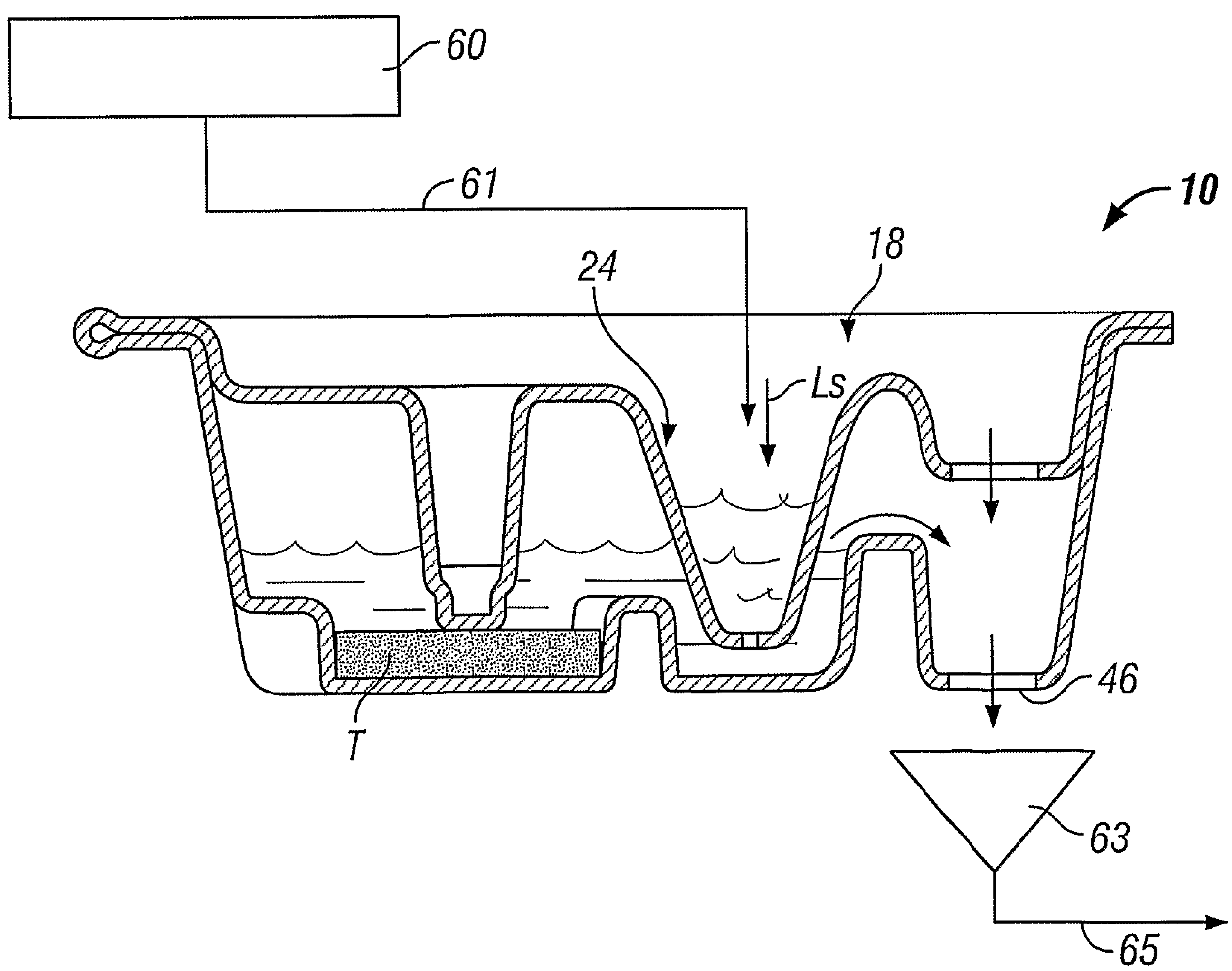

60
61
10
18
24
Ls
46
T
63
65

FIG. 8

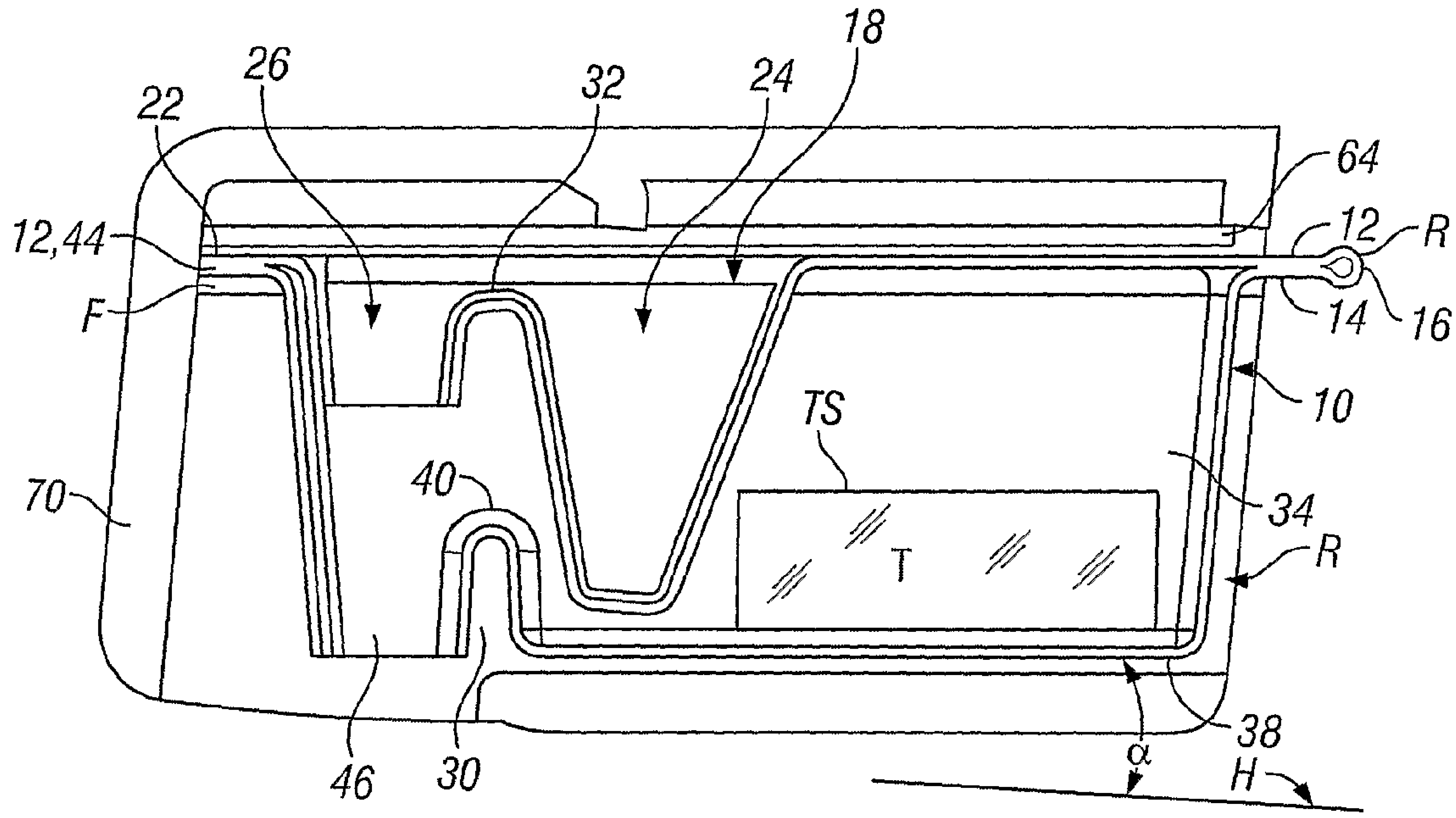


FIG. 9

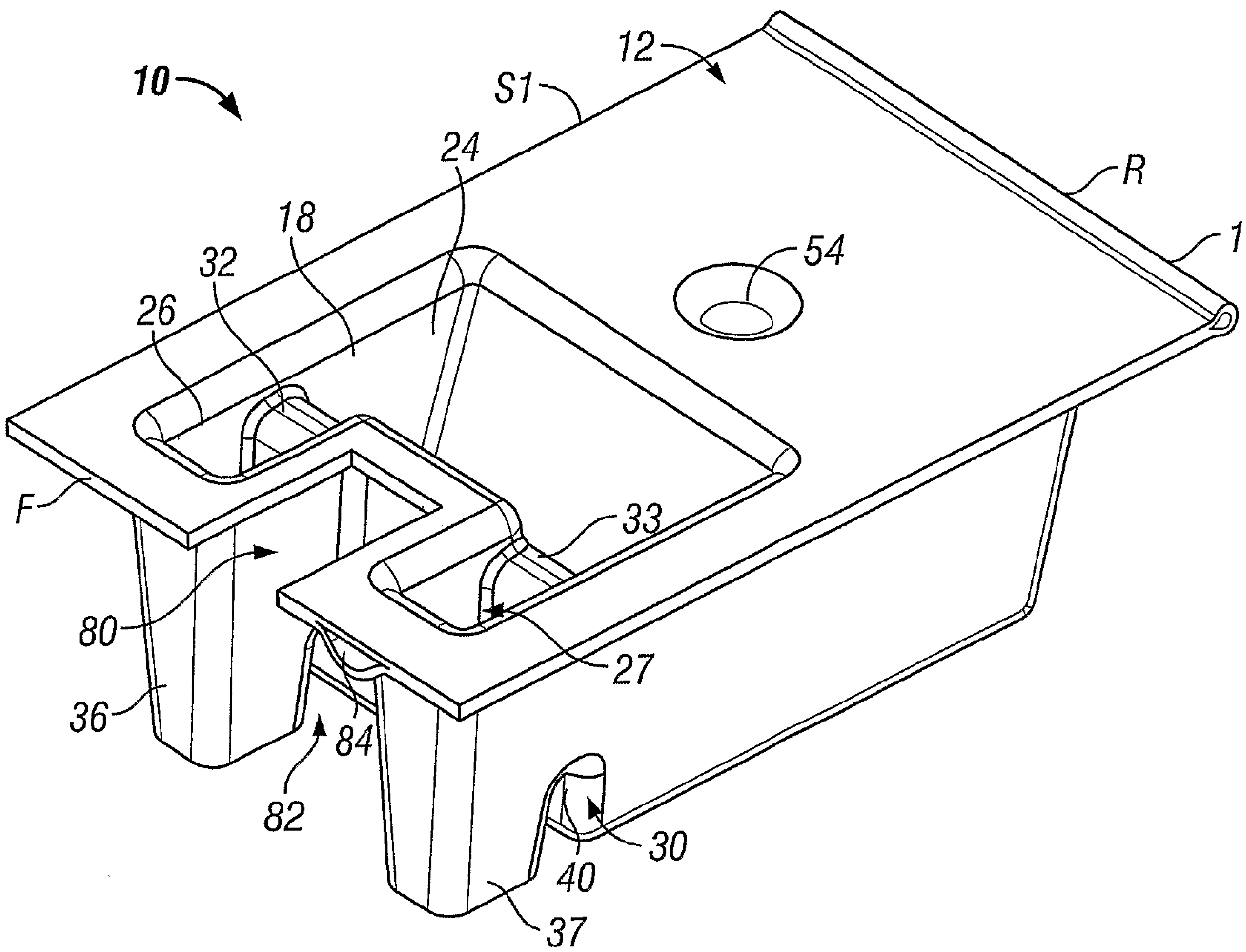

10
12
S1
R
16
24
18
54
32
26
F
33
80
27
36
84
82
30
40
37

FIG. 10

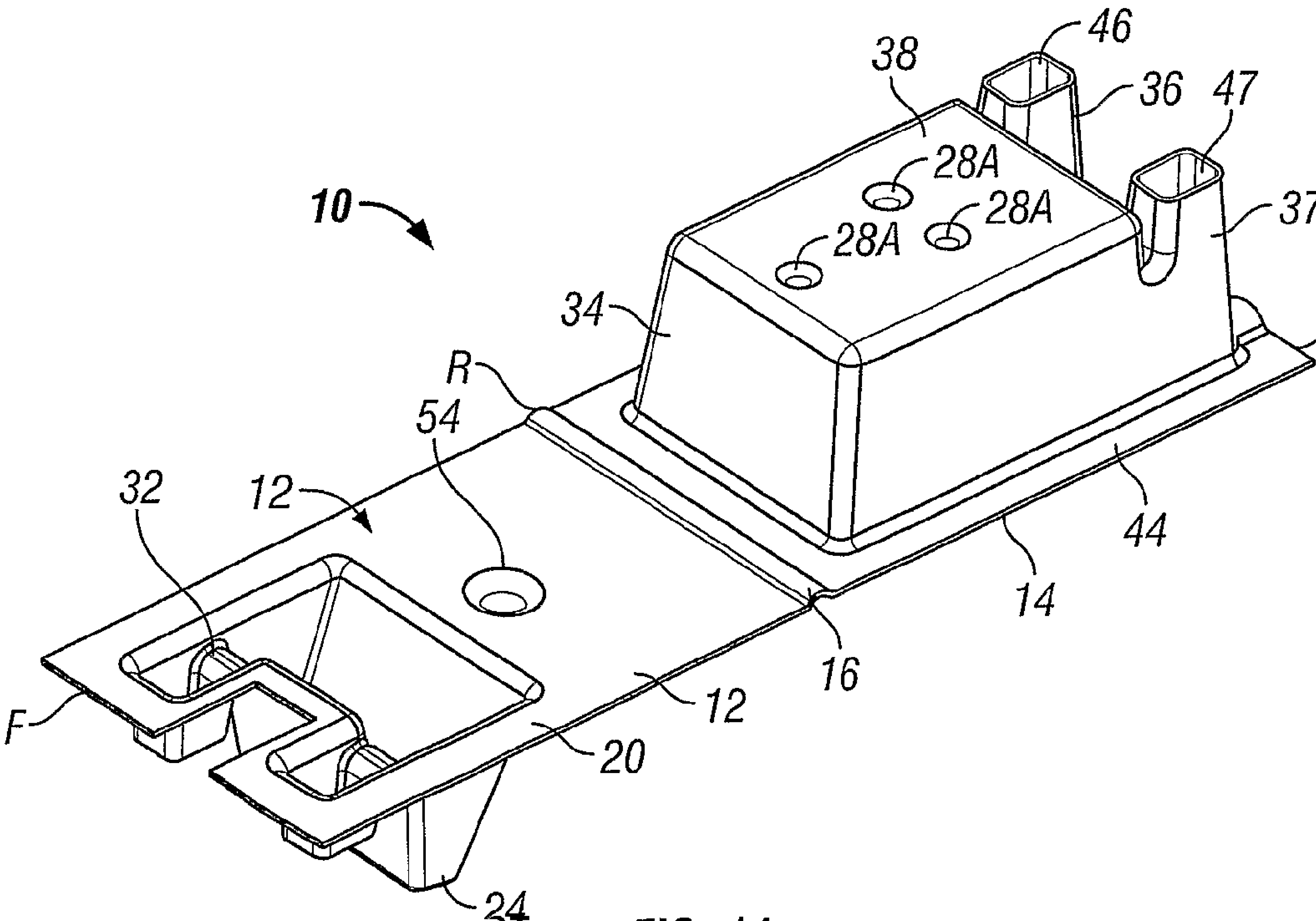
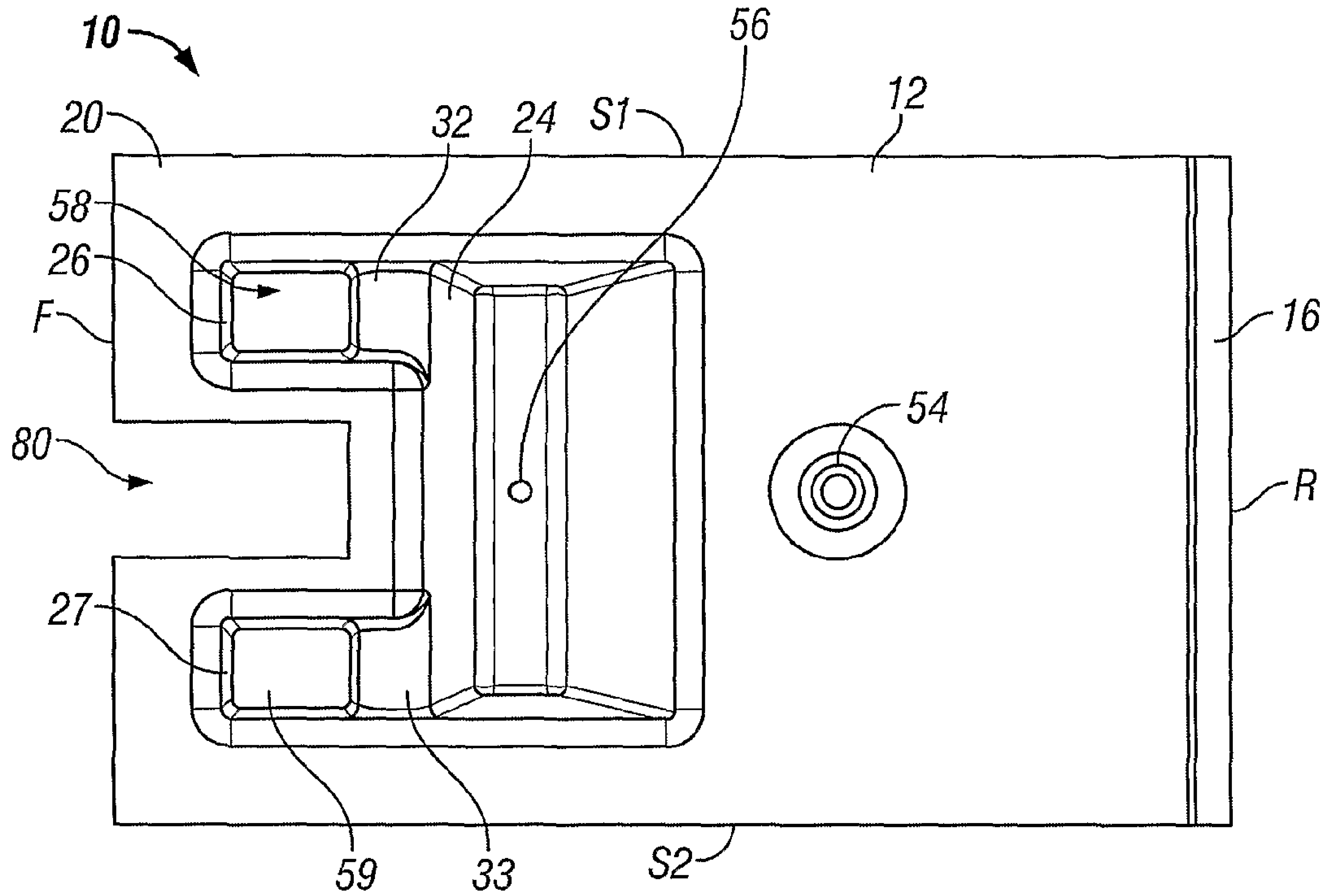
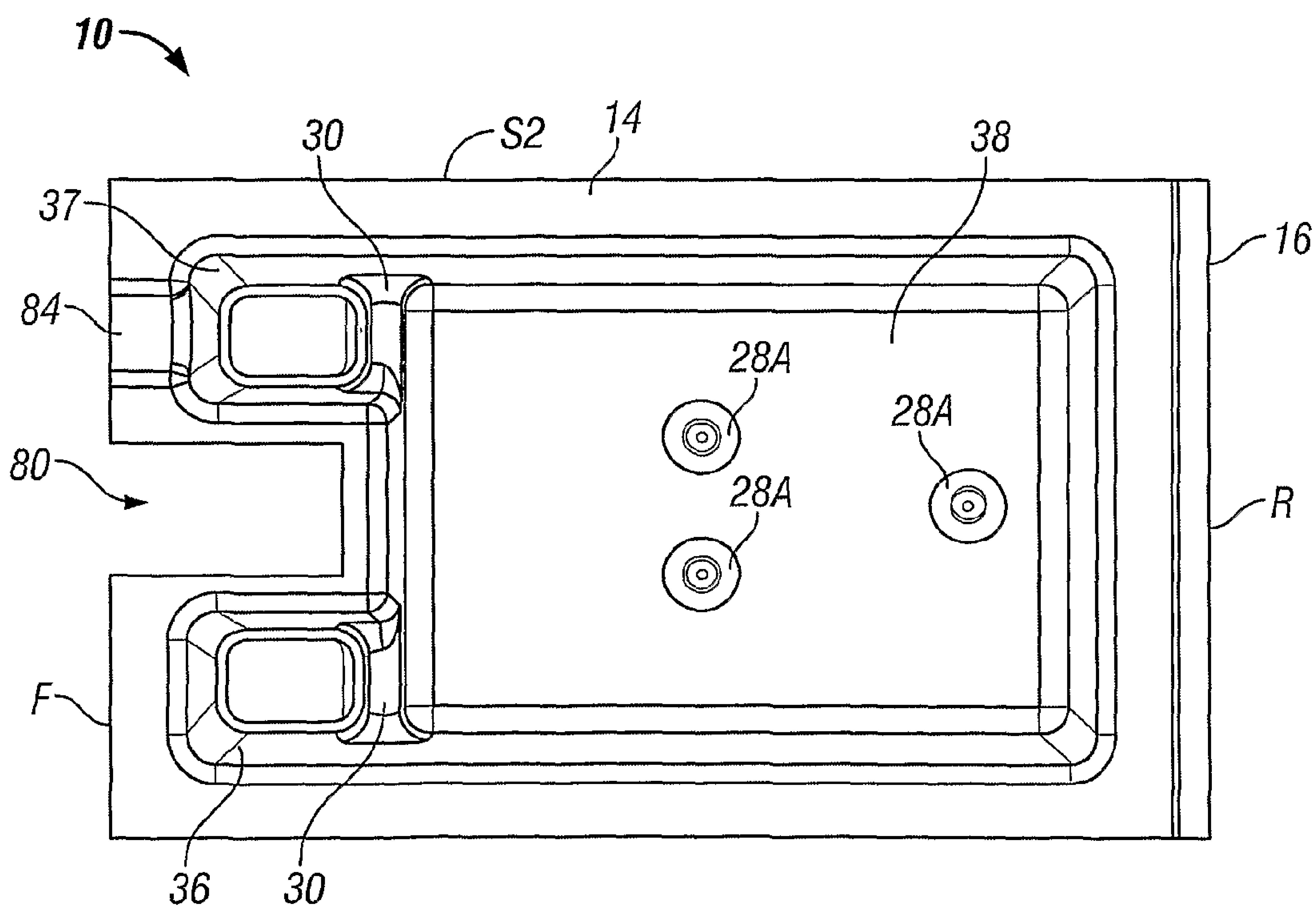

46
38
36
47
28A
28A
37
10
28A
34
F
R
54
44
32
12
14
16
12
F
20
24

FIG. 11



10
56
12
20
32
24
S1
58
26
F
16
54
80
R
27
59
33
S2

FIG. 12



10
30
S2
14
38
37
16
84
28A
28A
80
28A
R
F
36
30

FIG. 13

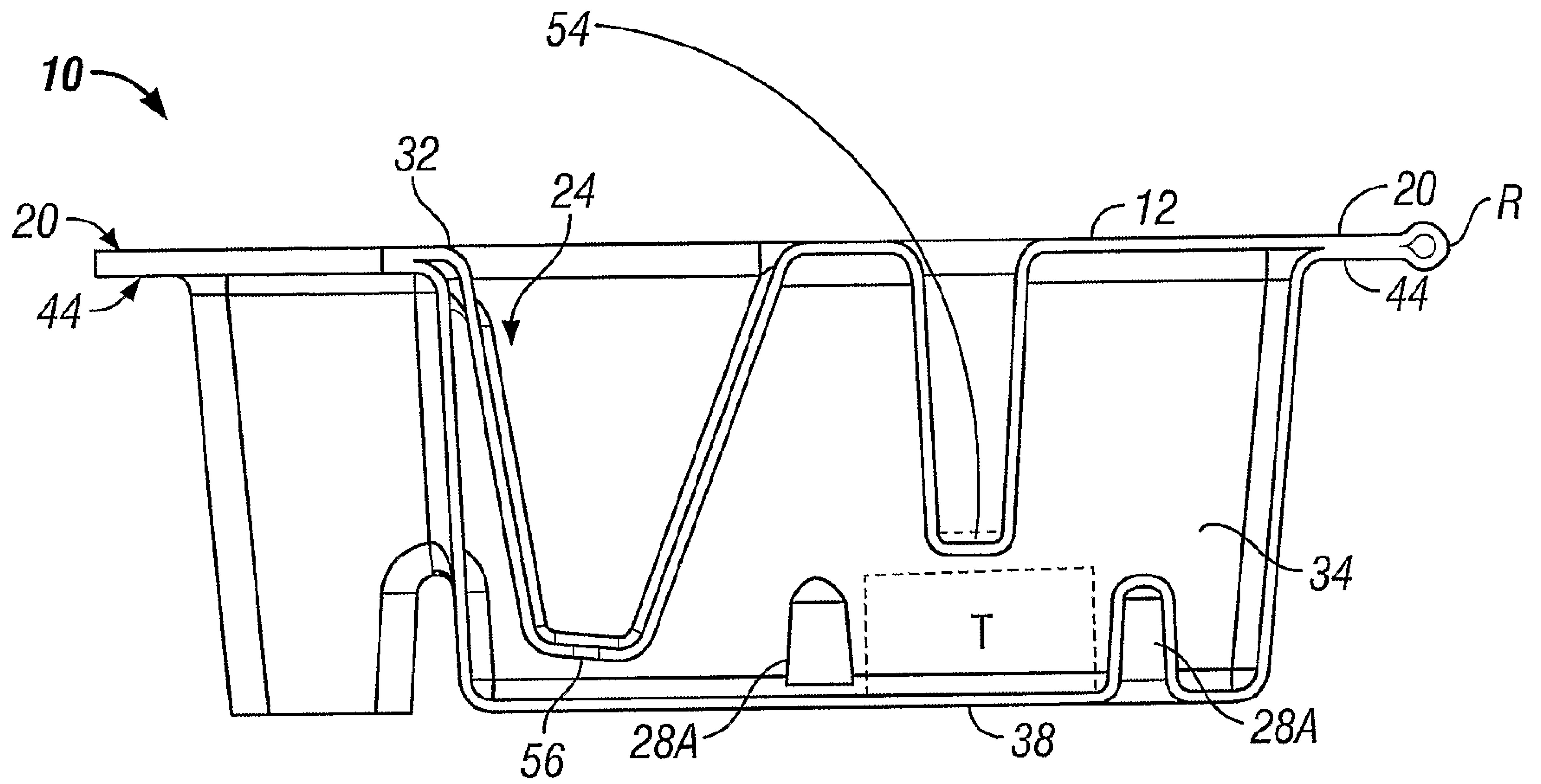
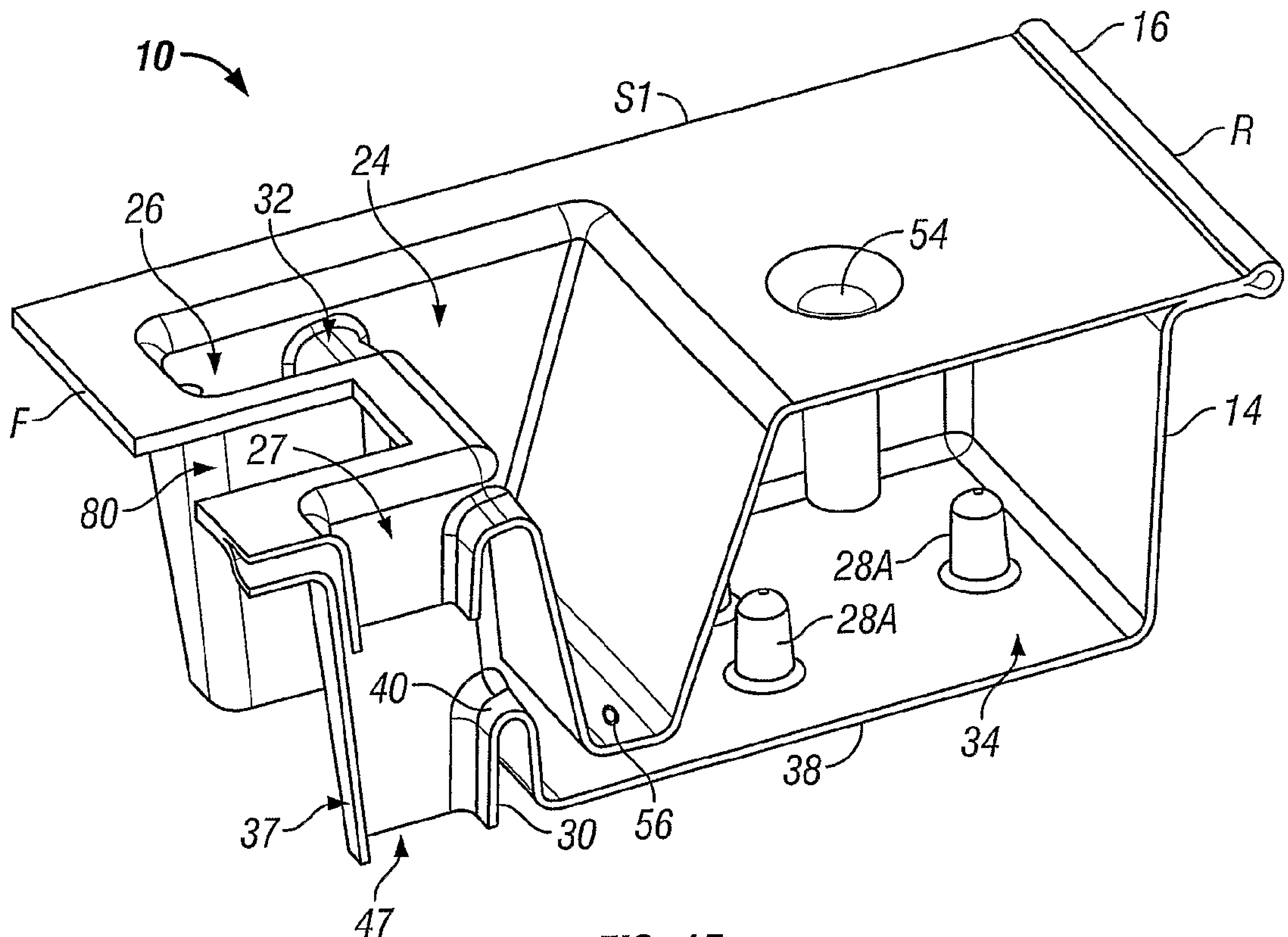

10
54
32
24
20
12
20
R
44
44
34
T
56
28A
38
28A

FIG. 14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16
S1
R
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F
27
14
80
28A
28A
40
34
38
37
30
56
47

FIG. 15

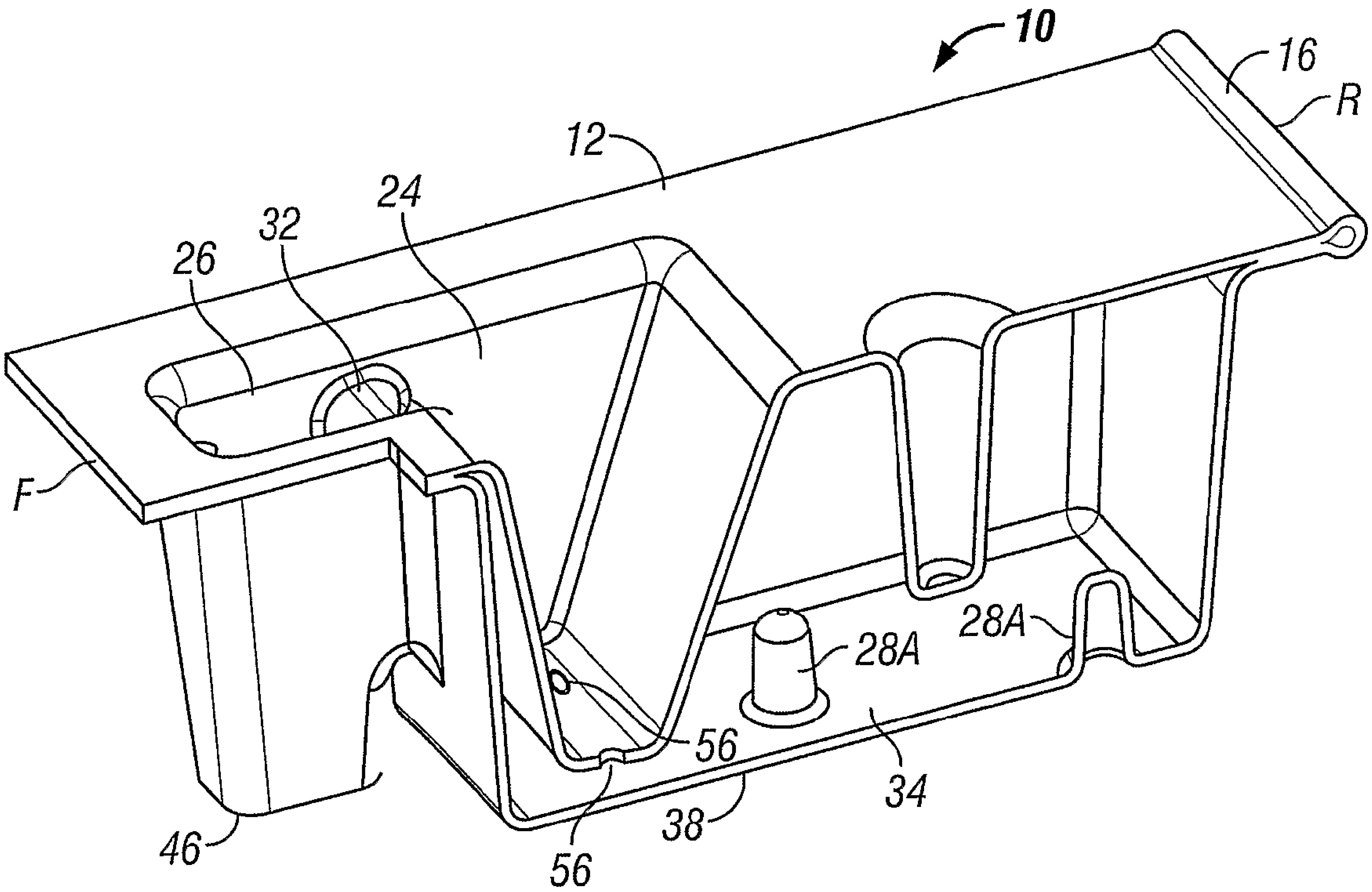


FIG. 16

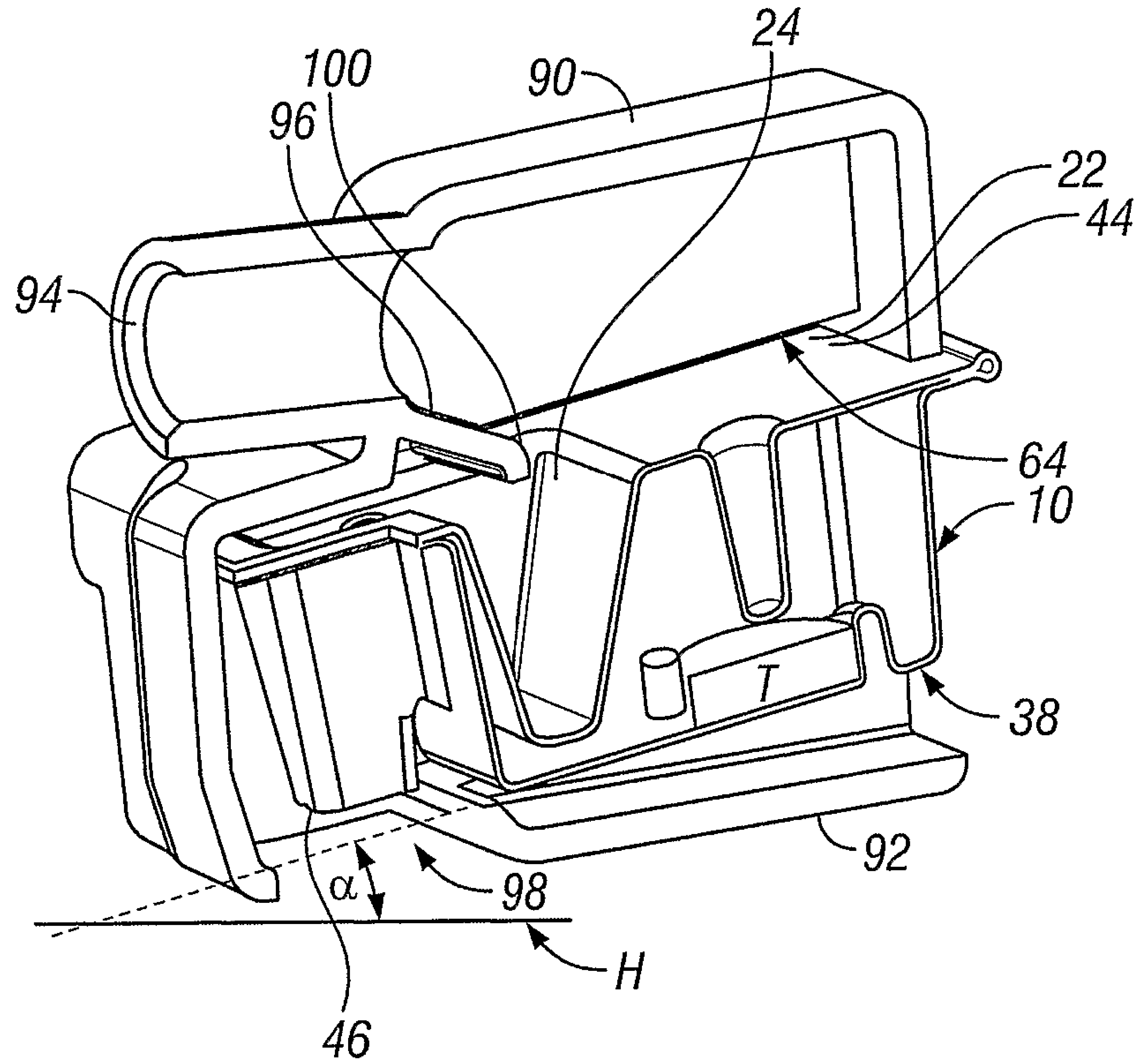
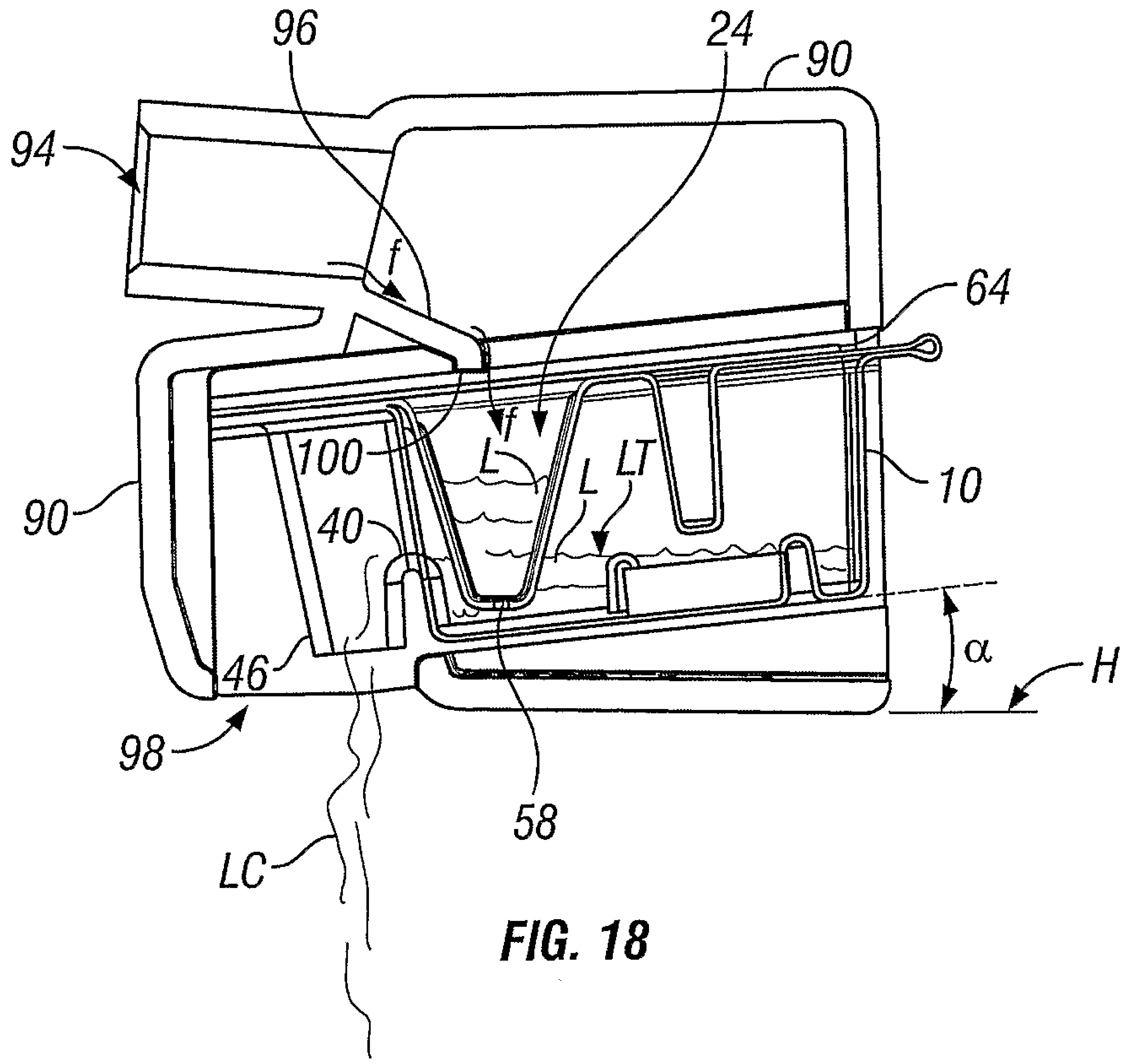


FIG. 17



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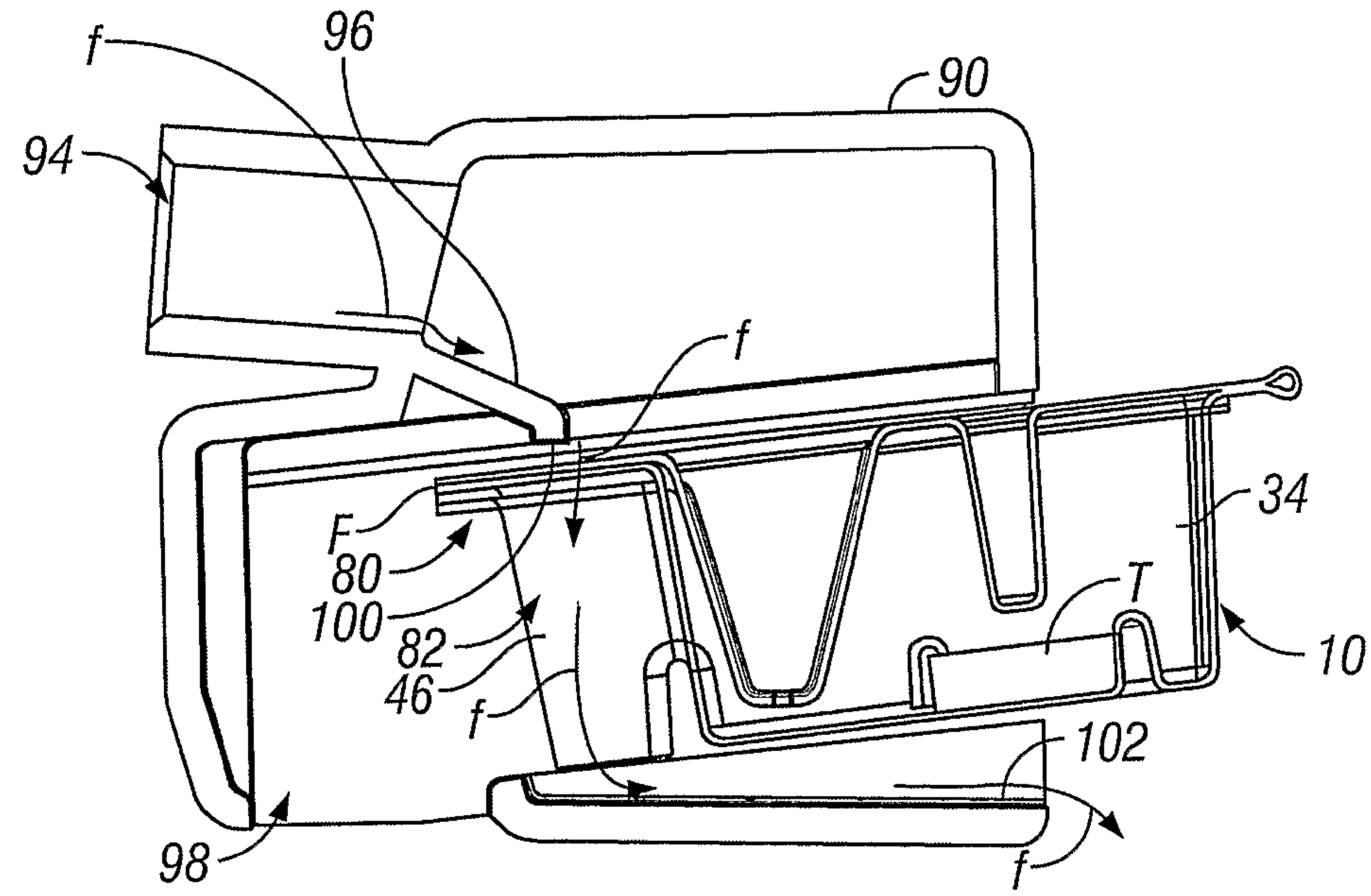
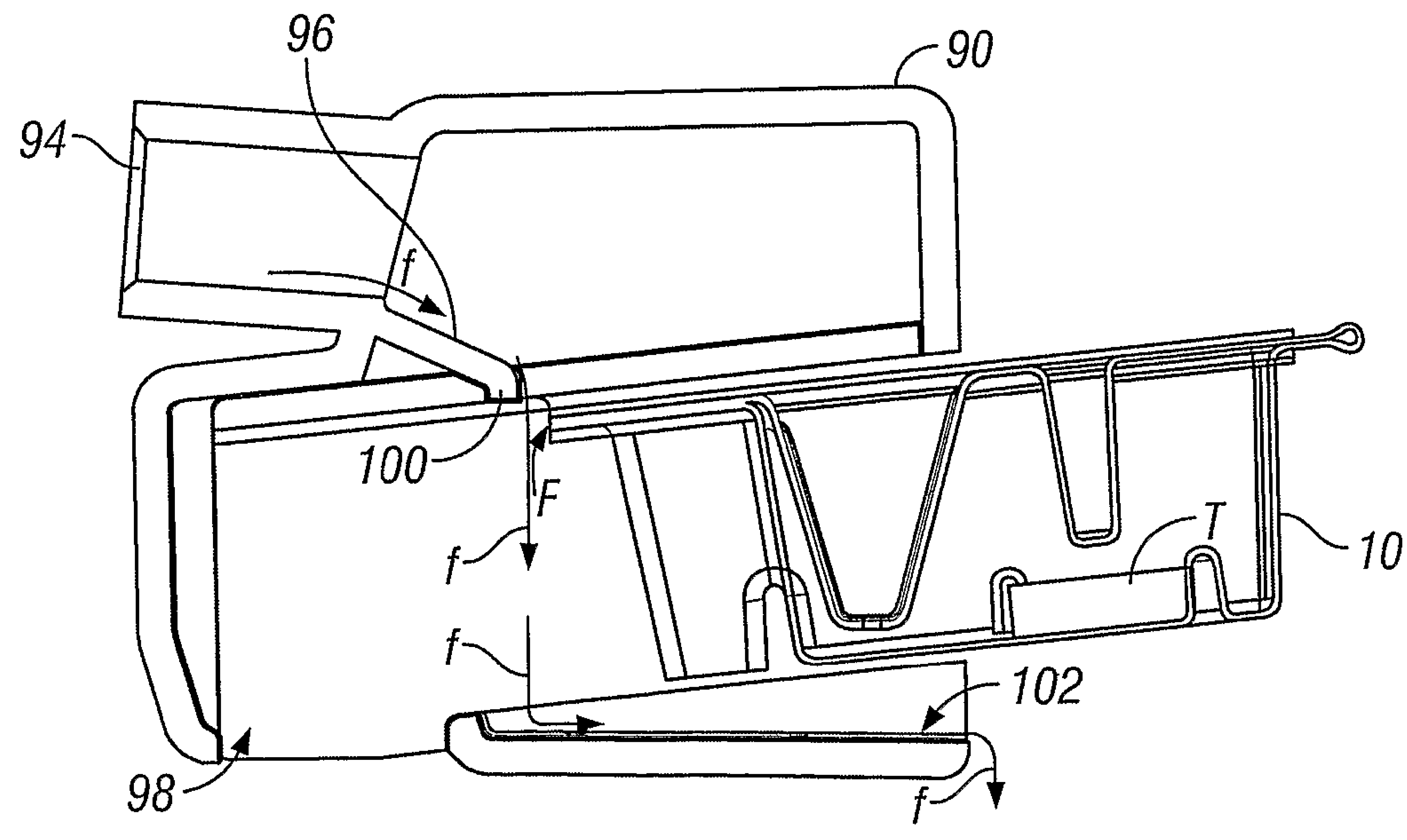

f
96
90
94
f
34
F
80
100
82
46
f
T
10
102
98
f

FIG. 19


96
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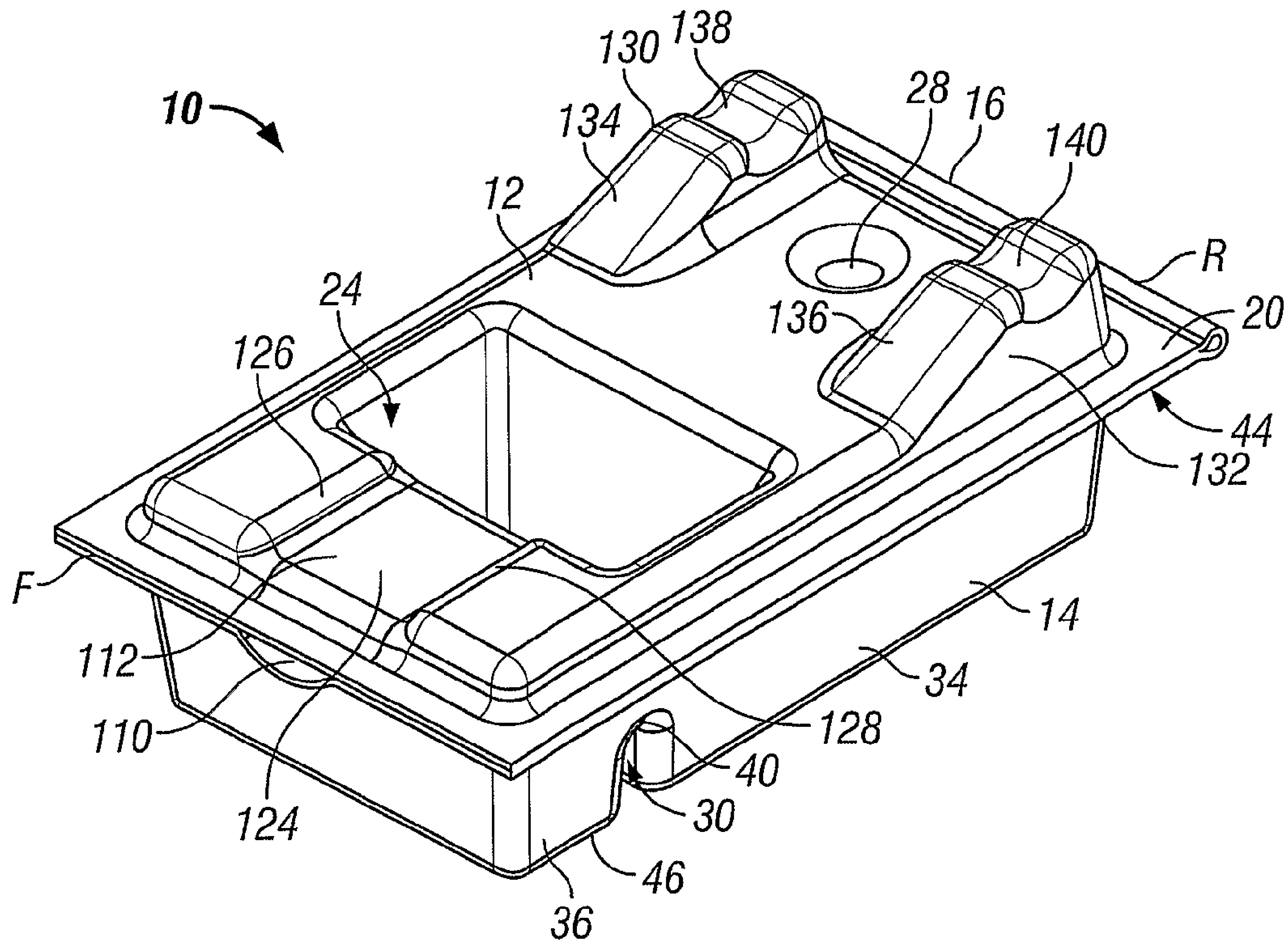
94
f
100
F
f
f
T
10
102
98
f

FIG. 20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130
138
134
28
16
140
12
R
24
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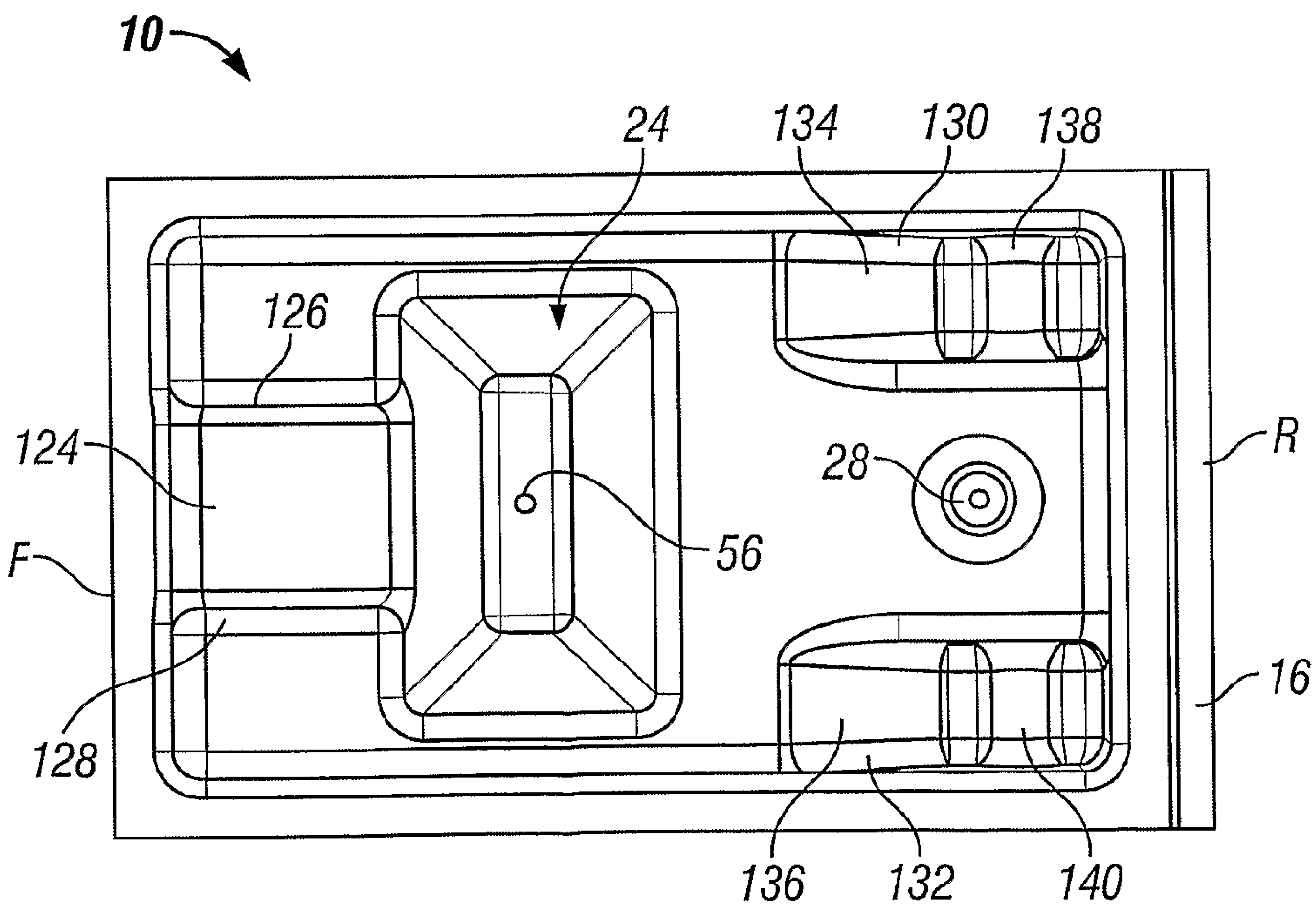
136
126
44
132
F
14
112
34
110
128
40
124
30
46
36

FIG. 21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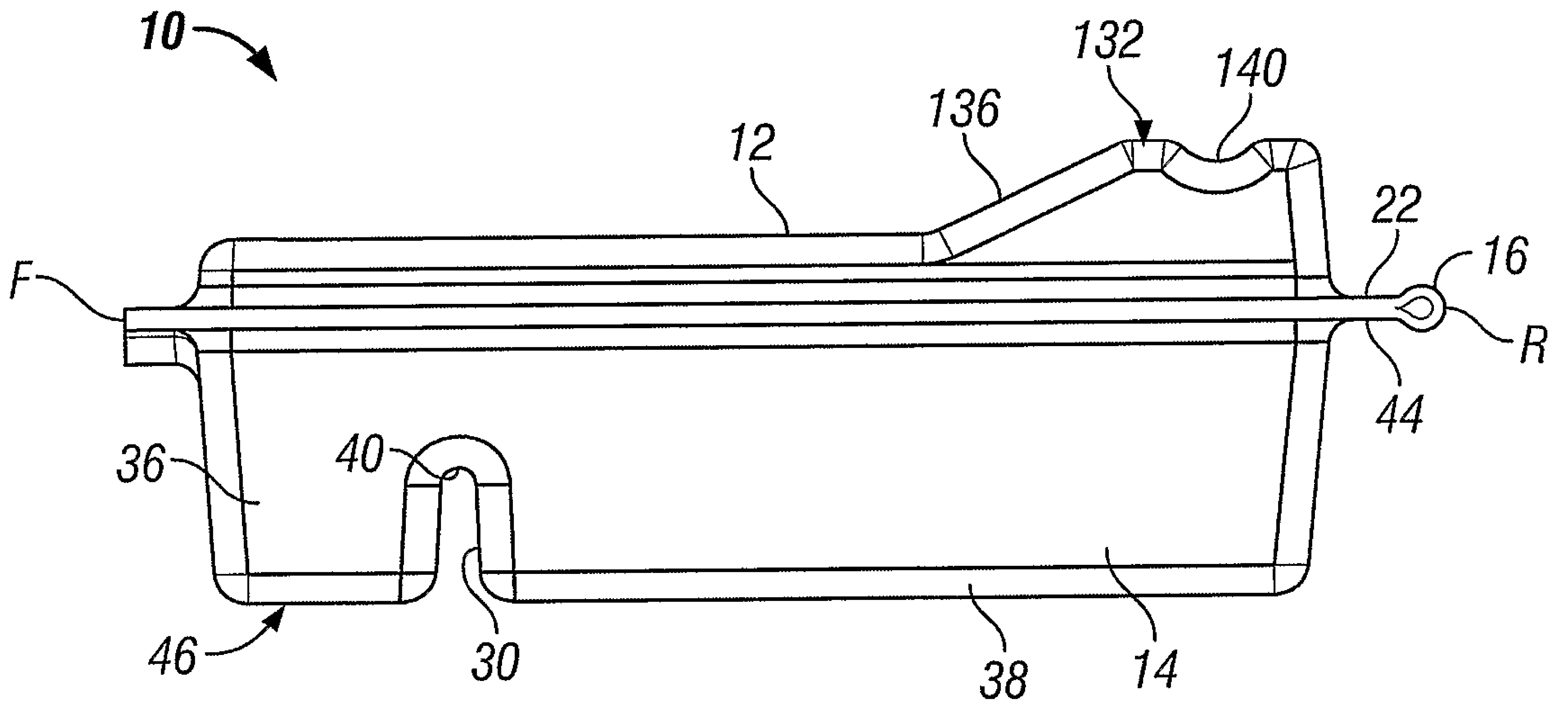
126
124
R
28
56
F
16
128
136
132
140

FIG. 22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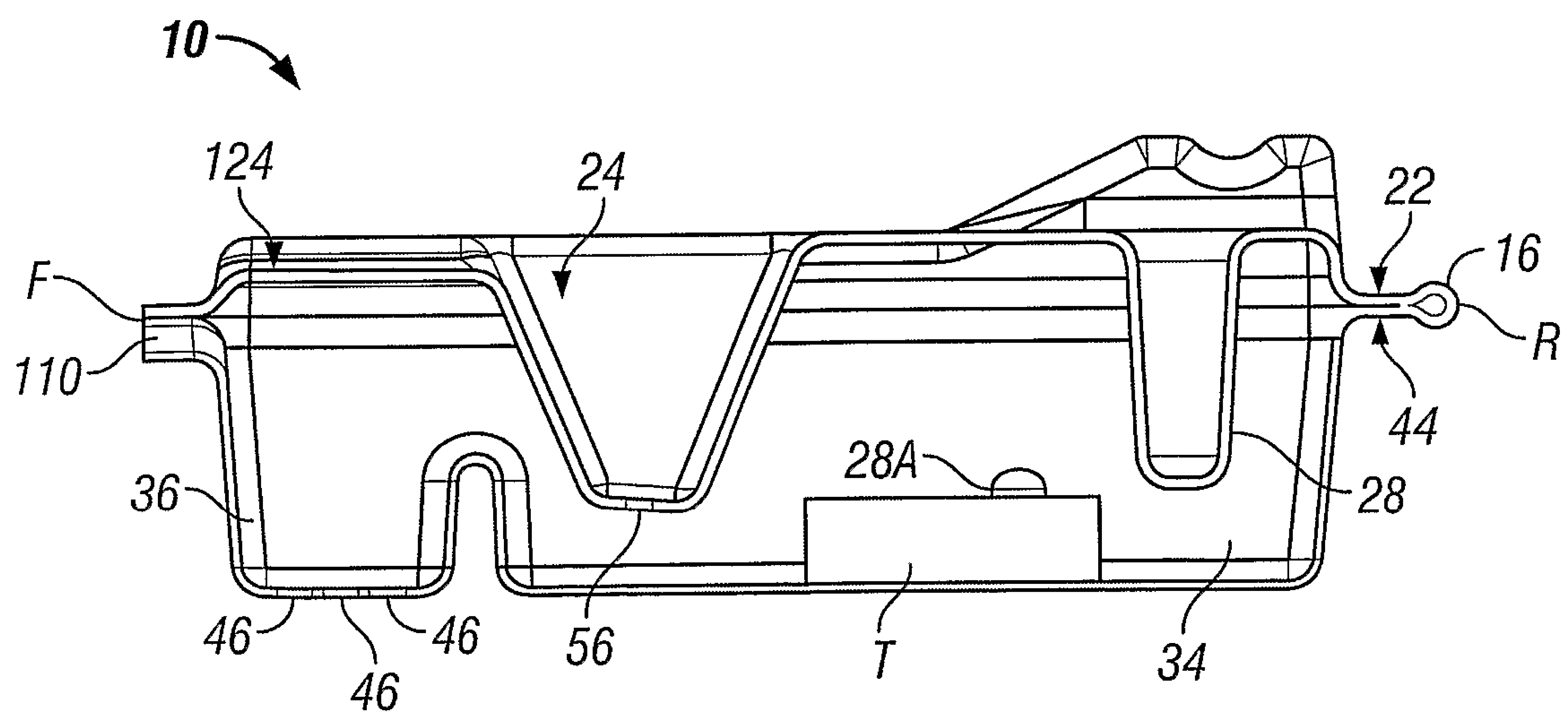
136
12
22
16
F
R
44
36
40
46
30
38
14

FIG. 23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R
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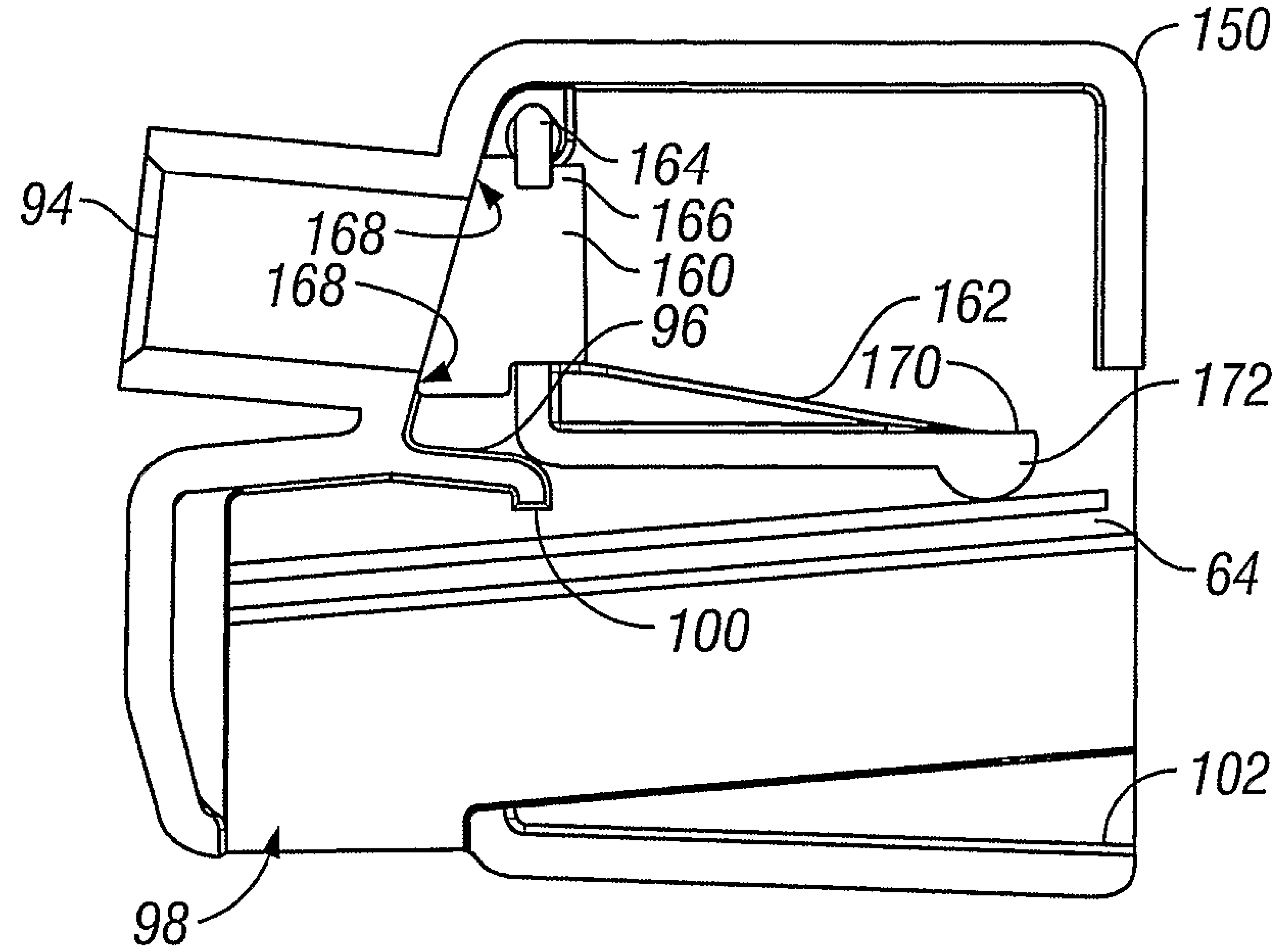
28A
36
28
46
46
56
T
34
46

FIG. 24


150
164
166
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168
168
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162
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170
172
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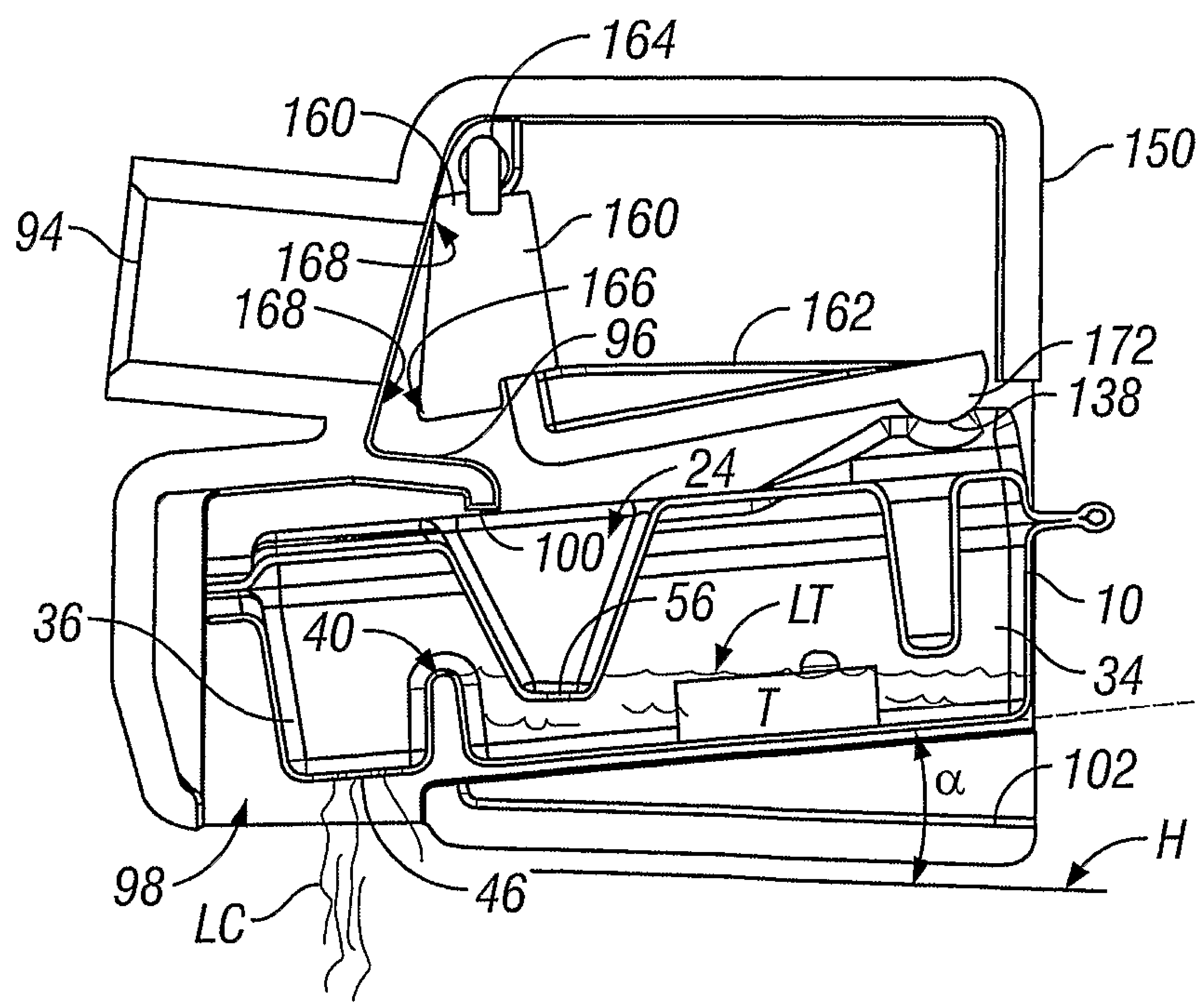
100
102
98

FIG. 25


164
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166
168
162
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56
LT
36
40
34
T
α
102
98
H
LC
46

FIG. 26

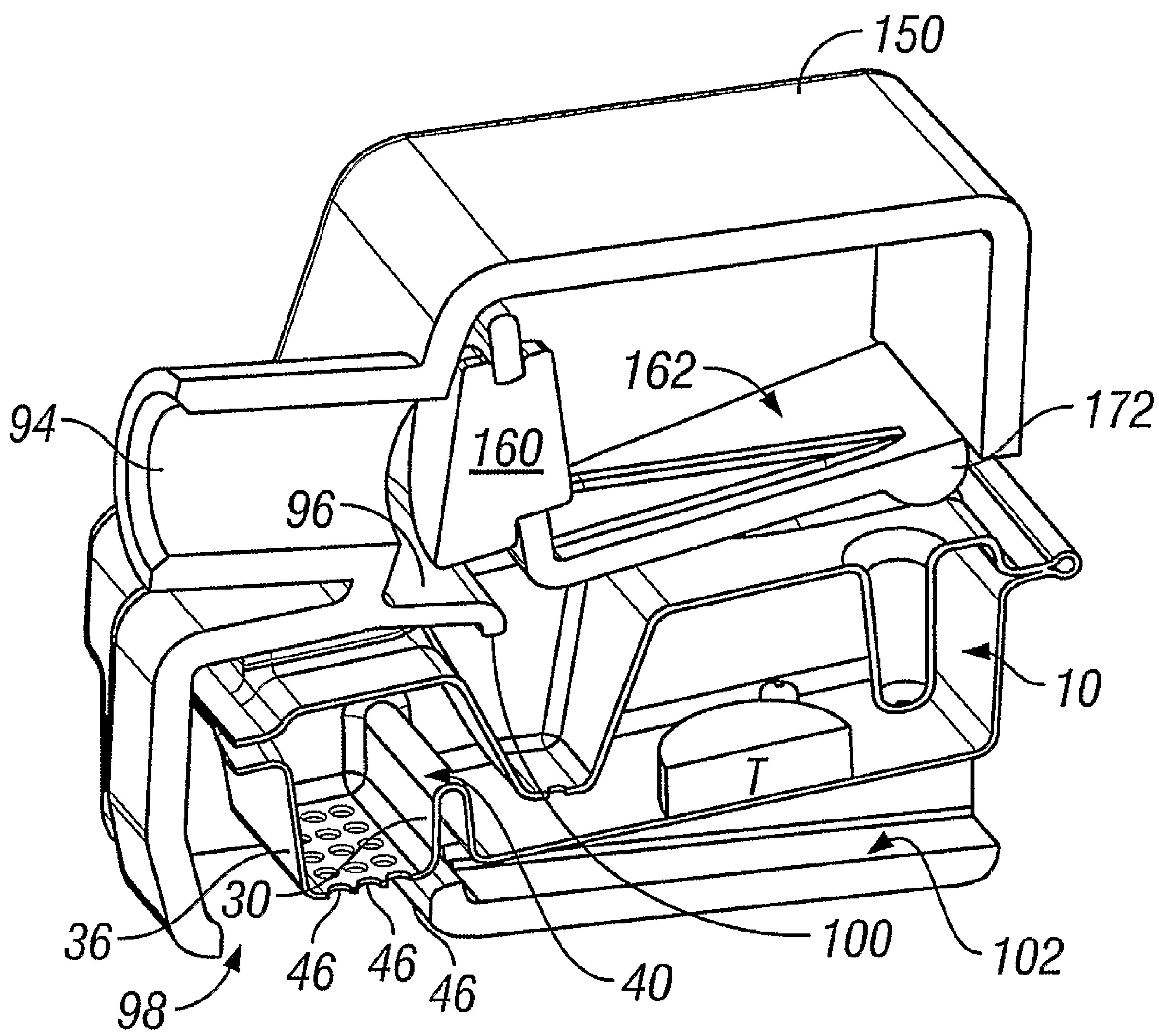

FIG. 27

CARTRIDGE-TYPE DISPENSER

This is an application filed under 35 USC 371 of PCT/GB2007/002161.

The present invention relates a cartridge-type dispenser for a dispersible or soluble material.

Delivery of a dispersible or soluble material from cartridges are known in the art. Such include for example tray-type modules containing a fragrance composition, particularly in a gelled form which is intended to be inserted into an air freshener-type device. In use, the air freshener-type device operates to heat the contents of the fragrance composition in order to dissipate it into the air. With respect to compositions which can be dispensed to a liquid or a fluid stream, such as a liquid stream, such devices are also generally known. For example, many known-art in the bowl ITB toilet treatment devices include an exterior housing having one or more passages therethrough, and contained within the housing is a quantity of a chemical treatment composition typically in the form of a gel, but most frequently in the form of a compressed block. The chemical composition is intended to be dispensed when flush water from the toilet, which is applied during the normal flush cycle of a toilet, washes over the housing and partially through the housing wherein it contacts the chemical composition. This quantity of water contacting the chemical composition dissolves or disperses a part thereof, to form a treatment liquor which then exits the housing and is delivered to the toilet bowl. Other articles comprising a housing which encases a chemical treatment composition are also generally known to the art.

Use of a cartridge-type device in order to supply a chemical treatment composition provides a number of important technical advantages. First, the chemical treatment composition may pose a risk of hazard to a consumer or a user, particularly if coming into direct contact with said chemical treatment composition. Use of such a cartridge then affords a degree of safety in that the cartridge provides a physical barrier denying contact between a consumer and the chemical treatment composition itself. Additionally, the use of a cartridge-type dispenser for a chemical treatment composition poses the advantage in that it may form a sub-unit or a module of a larger apparatus which is used to provide or to dispense a chemical treatment composition for a particular application. Rather than requiring the disposal of the complete device or unit, once the chemical treatment composition is exhausted then a simple replacement of the cartridge-type dispenser with a fresh dispenser containing a new quantity of a chemical treatment composition is all that is normally required. Such is particularly cost-effective and also reduces the unnecessary wastage of materials. A further advantage of the use of a cartridge-type dispenser for delivering a chemical composition is that the configuration or form of the cartridge-type dispenser can be produced such that it provides a degree of an anti-counterfeiting protection against misuse of the cartridge and/or the device within which the cartridge-type dispenser is used. For example, the housing of the cartridge can be modified or constructed in such a manner that it ensures that only a genuine replacement cartridge is insertable within an apparatus or device used for dispensing the chemical treatment composition. Additionally, the housing or the cartridge can be modified or constructed in such a manner that it also ensures that it is properly inserted and/or conjoined with a larger apparatus or device. The latter affords an additional degree of product safety where there may be a risk posed should the cartridge-type dispenser be improperly inserted or conjoined in the apparatus with which it is intended to be used. Thus, significant technical and a number of safety advantages are made possible upon the use of cartridge-type dispensers for the delivery of chemical treatment compositions.

Notwithstanding the large number of known cartridge-type dispensers used for the delivery of a chemical treatment composition, there is nevertheless a real and continuing need to provide still further improved cartridge-type dispensers to the relevant art.

In a first aspect the present invention is directed to an improved cartridge-type dispenser for a chemical treatment composition, e.g., in the form of a gel, tablet or block, which is useful in eluting one or more chemical compounds therefrom via dissolution or dispersion when contacted with water or other liquid into said water or other liquid to form a liquid treatment composition therefrom.

In a second aspect of the invention there is provided an improved cartridge-type dispenser wherein the chemical treatment composition is a solid composition or a gel composition which is at least partially dissolvable or dispersible in water.

In a third aspect of the invention there is provided an improved cartridge-type dispenser wherein the chemical treatment composition is a solid composition or a gel composition which is at least partially dissolvable or dispersible in a non-aqueous liquid, such as one or more organic solvents.

In a fourth aspect of the invention there is provided an improved cartridge-type dispenser wherein the chemical treatment composition is a solid composition or a gel composition which is at least partially dissolvable or dispersible in a blended aqueous/non-aqueous liquid, such as one or more organic solvents dissolved or dispersed in water.

In a fifth aspect of the invention there is provided an improved cartridge-type dispenser according to any of the first through fourth aspects of the invention wherein the chemical treatment composition is used to provide a sanitizing composition to the water or other liquid exiting said dispenser.

In a sixth aspect of the invention there is provided an improved cartridge-type dispenser according to any of the first through fourth aspects of the invention wherein the chemical treatment composition is used to provide a cleaning composition to the water or other liquid exiting said dispenser.

In a seventh aspect of the invention there is provided a treatment device which is adapted to operate in conjunction with an improved cartridge-type dispenser according to any of the first through fourth aspects of the invention.

According to an eighth aspect of the invention there is provided a process for treating water or other liquid which process contemplates the steps of:

supplying an improved cartridge-type dispenser according to any of the first through fourth aspects of the invention,

supplying a quantity of water or other liquid to the said dispenser in order to cause the dissolution or dispersion of at least a part of the chemical treatment composition contained within said dispenser and to form a liquid treatment composition.

According to a ninth aspect of the invention there is provided a process for producing a treated liquid composition which comprises the steps of:

providing a treatment device which is adapted to operate in conjunction with an improved cartridge-type dispenser according to any of the first through fourth aspects of the invention;

supplying an improved cartridge-type dispenser according to any of the first through fourth aspects of the invention to the treatment device;

supplying a quantity of water or other liquid to the treatment device and to said dispenser in order to cause the dissolution or dispersion of at least a part of the chemical treatment composition contained within said dispenser and to form a liquid treatment composition.

These and other aspects of the invention will be better understood from a review of the following detailed description and accompanying figures.

It is believed that certain aspects of the present invention will be better understood from the following description of preferred embodiments, taken in conjunction with the accompanying drawings, in which like reference numerals identify identical elements.

FIG. **1** depicts a cartridge-type dispenser **10** according to a preferred embodiment of the invention the cartridge-type dispenser includes a top **12**, a bottom **14**, which are joined by a hinge **16**. The dispenser **10** had a front “F”, a rear “R”, a first side S1 and opposite therefrom a second side S2. As can be seen from FIG. **1**, the dispenser includes an upper cavity **18** which is bounded by a flange **22** which defines a flat frame surface. As is further visible from this figure, the upper cavity **18** contains a supply weir **24** as well as an overflow weir **26**. Also visible is the retention post **28** which extends downward into the bottom part **14** and which will be described with further detail thereafter. Also visible within FIG. **1**, is one end of the dike **30** which is in this embodiment, integrally formed with the bottom part **14** of the dispenser **10**.

FIG. **2** depicts in a side plan view the cartridge-type dispenser of FIG. **1** in an unfolded or opened configuration. The dispenser **10** is herein depicted opened about the hinge **16** such that the details of elements of the top part **12** are illustrated more clearly. As can be seen, extending downwardly (when in a closed configuration), but here shown as extending upwardly in this open configuration are the supply weir **24**, the overflow weir **26** as well as the retention post **28**. The specific functions of these elements of the cartridge-type dispenser **10** will be described hereinafter. It is sufficient to note however that a portion of the supply weir is joined by virtue of an overflow channel **32** which provides fluid communication between the supply weir **24** and the overflow weir **26** when the cartridge-type dispenser **10** is closed as depicted in FIG. **1**. It is further important to note that with regard to FIG. **2**, that the dike **30** extends across the bottom part **14** of the cartridge-type dispenser **10** and divides the bottom part **14** into two separate sections, a trough section **34** and an exit section **36**. As it is seen in this embodiment, as the base **38** of the bottom part **14** is essentially flat it is readily conceived that the height of the dike, that is, to say the distance between the crest **40** of the dike **30** and the base **38** may be used in controlling the amount of a liquid, e.g. water or other liquid, within the bottom part **14** and within the trough **34**. Thus, variation in the height of the dike, by either increasing or decreasing the distance between its crest **40** and the bottom **38** may be used to limit the depth of the liquid contained within the trough **34**.

Turning now to FIG. **3**, there is depicted a plan view of the opened or unfolded cartridge-type dispenser **10** as depicted in FIGS. **1** and **2**. Various features of the foregoing figures are more clearly defined from FIG. **3**. Turning first to the bottom part **14** of the dispenser **10**, the dike **30** and its upper-most part thereof namely its crest **40** can be seen to divide the trough **34** from the exit section **36**. As is clearly visible, the trough **34**, the exit section **36** and indeed the dike **30** are all formed within a recess **42** which extends downwardly from a bottom flange **44** which extends around this recess **42**, and which bottom flange **44** defines the top-most part of the bottom part **14**. With regard first to the exit section **36** which is positioned towards the front of the cartridge **10**, the exit weir contains within a through perforation or exit **46**. The through perforation, although not visible in either FIG. **1** or **2**, is to be understood as being a perforation, or for that matter may be a plurality of perforations (as depicted in later figures and embodiments), which permits for the egress of water or other liquid to exit from within the interior of the cartridge **10**. Thus, this exit **46** acts as the fluid or liquid outlet for the cartridge-type dispenser **10**. Now moving away from the front of the cartridge **10**, intermediate the exit section **36** and the trough **34** is the dike **30**. As will be readily understood from conjointly viewing FIGS. **2** and **3**, the dike acts to provide a liquid dam between the exit section **36** and the trough **34**; liquid contained within the trough **34** must necessarily overcome or flow over the crest **40** of the dike **30** in order to enter the exit section **36** and thence exit the cartridge-type dispenser **10** by flowing outwardly through the exit **46**. Depicted in dotted line and within the bottom of the trough **34** is a tablet “T”. The tablet is representative of a chemical treatment composition which can be a solid, gel, semi-solid, paste, or for that matter any material which is at least partially dissolvable or dispersible in the liquid which is introduced into the trough **34**. For the sake of convenient reference, a generally short cylindrical tablet “T” is depicted. The tablet is retained in its position by being lodged or located between a retention wall **48** on one side and by a retention pin **50** approximately perpendicularly across from the retention wall **48**. Both of these latter elements may be integrally formed as part of the dispenser **10**, but it is to be understood that one or both of these may be omitted. The provision of such elements is however convenient in instances wherein the form of the chemical treatment composition has a surface area which is less than the surface area of the bottom **38** of the trough **34** and/or in order to prevent it sliding or being dislodged during the use of the cartridge-type dispenser **10**. Providing such elements, or other elements, may be utilized in order to retain the chemical treatment composition in a specific region or location of the trough **34**.

It is also to be noted that there is provided an inlet zone **52** which is a portion of the trough **34** which is adapted to receive a portion of the supply weir **24** when the cartridge-type device is assembled into the closed configuration according to FIG. **1**. In this preferred embodiment, the supply weir **24** extends downwardly and into the interior of the bottom part **14** of the dispenser **10**. In such an arrangement, it is foreseen that the retention wall **48** may be eliminated and rather, the position of the supply weir **24** may also be used, or be used in place of the retention wall **48** in retaining a tablet within the weir **34**.

Moving yet further away from the front of the cartridge-type dispenser **10** of FIG. **3**, it is seen that the top part **12** and the bottom part **14** are joined by an intermediate hinge **16**. Although such a hinge is not necessary and the top part and the bottom part may be joined by simply layering the top part upon the bottom part in register, and thereafter sealing or otherwise joining the top part to the bottom part, the use of a hinge is particularly convenient in that it permits for the manufacture of the cartridge-type dispenser **10** in a single mold. Additionally, the use of a hinge particularly such as that depicted which runs along the edge of both the top part and the bottom part also ensures very consistent and reliable alignment of the top part **12** to the bottom part **14** when these two parts are closed to form the configuration as depicted in FIG. **1**. Such reduces operator error, and/or machine error which may be used to perform this function.

FIG. **3** illustrates the retention pin **54** which, is integrally formed with the retention post **28** of the top part **12** of the dispenser **10**. As is more clearly understood with relation to

FIG. 2, the height, that is to say the distance between the top flange 22 and the base 56 of the retention pin 54 may be suitably dimensioned such that, when the device 10 is in a closed-type configuration according to FIG. 1, the distance between the base 56 and the interior of the base 38 of the trough 34 is suitable to accommodate within this space a tablet T. While not an essential feature of the invention, according to preferred embodiment and wherein a tablet is supplied and used with the cartridge-type dispenser 10, a retention post 28 is necessarily present in order to ensure that the tablet (or other chemical treatment composition) is retained within the trough such that at least a portion of the tablet is in contact with liquid which is present within the trough 34. The retention post 28 need not however include a retention pin 54, although such is conveniently present. Advantageously, when the cartridge-type dispenser 10 is in a closed configuration according to FIG. 1, the height of the retention post 28 is sufficiently great such that the height between the bottom 38 of the trough 34 and the crest 40 of the dike 30 is greater than or approximately equal to the height between the bottom 38 of the dike 34 and the bottom of the supply weir 24. In this manner, when liquid is present in the trough 34, and preferably when sufficient liquid is in the trough 34 such that its level extends upwardly from the base 38 to the crest 40, most, or all of the tablet T is immersed within the liquid present within the trough 34.

Moving yet further away from the front F of the FIG. 3, there is next encountered the supply weir 24, which includes a supply hole 56. The supply hole is understood to be a through hole, such that any liquid which collects within the supply weir 24 when the cartridge is in the configuration according to FIG. 1, said liquid will enter, or drain from the exterior, into supply weir 26 and through the supply hole 56 and flow into the interior of the trough 34. In the particular embodiment depicted in FIG. 3, a single supply hole 56 is illustrated however, it is to be understood that a plurality of holes, a slot, a mesh, or any other type of orifice or passage may be utilized to permit for the entry of liquid supplied from the exterior into the supply weir to pass through said supply hole 56 and into the interior of the cartridge-type dispenser 10.

It will be understood that the dimensions as well as the number of the supply hole(s) 56 plays an important role in the operation of the cartridge-type dispenser 10. Namely, wherein the cartridge-type dispenser 10 is used in atmospheric pressure, that is to say in a non-pressurized environment, the simple force of gravity will be primarily responsible for ensuring fluid flow from the exterior and into the interior of the device 10. Variation in the size, and/or the number of the orifices passing through from the bottom of the supply weir 26 and into the interior of the device also has a direct relationship upon the fluid flow rate which is permitted to enter the trough 34 and to come into contact with the Tablet. Thus, where a slow flow rate is desired, the use of a very small and/or a very small number of orifices having reduced dimensions will limit the input rate of liquid entering the trough 34 via the supply weir 26. Conversely, when a greater rate of liquid is desired to be introduced into the interior of the cartridge-type dispenser 10, then one or more orifices or passages of a larger dimension which provide less resistance to fluid flow from the supply weir 24 and into the trough 34 of the device 10 may be used. What is to be considered an optimal flow rate will of course vary widely depending upon the conditions, as well as the relative dimensions of the cartridge-type dispenser, the solubility of, the quantity of, and even the geometric configuration of the chemical treatment composition present within the trough. Such factors need to be taken into consideration; variation in some of these physical parameters of the cartridge-type dispenser 10 can be adjusted however to meet a wide variety of operating conditions.

Moving still further away from the front of the cartridge-type dispenser 10, there is next encountered the overflow weir 26 which terminates in an overflow exit 58. The overflow exit 58 is positioned at the bottom of the overflow weir 26 and is a through hole or a through passage which permits for the egress of liquid which may be supplied to the upper cavity 18 or the supply weir 24 or both. As can be seen from a view of FIG. 2 as well as FIG. 3, when the cartridge-type dispenser 10 is in a closed configuration as per FIG. 1, it is seen that the overflow exit 58 is positioned above the exit section 36 and its corresponding exit 46.

With regard now to FIG. 1 and FIG. 2, as had been noted previously a overflow channel 32 provides fluid communication between the supply weir 24 and the overflow weir 26. As is best understood with respect the FIG. 1, wherein a supply of a liquid is introduced into the upper cavity 18 at a rate which exceeds the normal inlet rate of the supply weir 24 and the supply hole 56, then any excess liquid then flows through the channel 32 and into the exit weir 26. Such excess liquid then exits through the outlet 58 which flows directly downwardly into the exit 46 and then outward from the cartridge-type dispenser 10 of the invention. It is further significant to point out that such excess liquid which exceeds the capacity of the supply weir 26 and its supply 56, is permitted to exit through the overflow weir in the manner just described and the quantity of excess liquid never contacts the quantity of liquid within the trough 34 and contact with the Tablet and thus does not further dilute the chemical treatment composition formed by the quantity of liquid contacting the tablet T. Additionally also, as the top part 12 and the bottom part 14 are sealed at their respective flanges 22, 44 and most desirably provide a liquid-tight seal at this junction, even larger amounts of liquid when supplied to the upper cavity 18, even when supplied in an amount in excess of the normal capacity of the overflow weir 26 merely flow over the flanges 22 and do not enter the interior trough 34 of the cartridge-type dispenser 10.

The operation of the cartridge-type dispenser 10 will be described in more detail with regard to FIGS. 4, 5, 6 and 7.

FIG. 4 depicts a cartridge-type dispenser 10 prior to the introduction of any liquid to its interior. As can be seen, the tablet T is retained against the base 38 of the trough 34 by means of the retention post 28. Moving in the direction of the front F is next seen the supply weir 24 whose base 24A includes a supply hole 56 at the lowest part thereof. The portion of the supply weir 24 which includes the supply hole 56 is also positioned within the trough 34 of the cartridge-type dispenser 10. As can be seen readily from the figure, the distance from the base 24A of the supply weir 24 to the base 38 of the trough 24 is less than the distance between the crest 40 of the dike 30 which separates the trough 34 from the exit section 36 and the exit 46 located at the bottom of the exit section 36. Also seen is the correspondence between the top flange 22 and the bottom flange 44 which are layered in register to each other and are understood to form a liquid tight seal there between.

Turning now to FIG. 5, the operation of the cartridge-type dispenser 10 upon the introduction of initial amounts of a liquid L is more readily described. As is thereon seen, the liquid "L" is introduced into the supply weir 24 wherein, it flows through the supply hole 56 and into the interior of the trough 34. The direction of fluid flows indicated by the arrows "a". As is seen and as is readily understood from an examination of the figures, the head pressure of the liquid L in the supply weir **24** forces the liquid passing downwardly through the supply hole **56** to fill up the trough **34**. During this operation, the liquid comes into contact with the tablet T.

Turning now to FIG. **6**, there is depicted a further embodiment of the cartridge-type dispenser **10** depicted in part in FIGS. **4** and **5** however illustrating a "steady-state" operational status. As is seen therein, a sufficient supply of liquid L is supplied to the supply weir **24** such that the top level "LT" of the liquid is at a point above the level of the crest **40** of the dike **30** yet is not sufficiently high to enter the channel **32** and exit via the overflow weir **26**. As can be seen, the liquid level ensures that there is a sufficiently high level of liquid within the trough **34** such that a supply of liquid enters into the trough **34** from the supply weir via the supply hole **56**, at least part of which comes into contact with the tablet T while concurrently a portion of the liquid L within the trough **34** exits the trough **34** by overflowing the crest **40** of the dike **30** and exiting the cartridge-type dispenser via the exit **46**. As will be readily understood, the maintenance of approximately, but preferably a uniform quantity of a liquid within the supply weir **24** as illustrated ensures that an approximately constant mass of liquid enters, and exits the trough **34** in the manner described. This liquid L within the trough **34** coming into contact with the tablet T ensures that a part is dissolved, or dispersed, or otherwise at least are eluted into the liquid forming a treatment liquid composition which exits the cartridge-type dispenser **10** and in the manner described.

FIG. **7** illustrates a further embodiment of the cartridge-type dispenser **10** illustrated in prior FIGS. **4**, **5**, and **6** but in this depiction illustrates an excess overflow condition for the liquid L being supplied to the interior of the upper cavity **18** of the cartridge-type dispenser **10**. As is visible from FIG. **7**, the top of the liquid "LT" is sufficiently high to ensure that the supply weir **24** is overfilled such that a portion of the liquid L flows through the channel **32** and into the overflow weir **26**. During such a condition, the liquid enters into the trough **34** via the supply hole **56**. As described before with reference to FIGS. **5** and **6**, at least part of the liquid L comes into contact with the tablet T before flowing out over the crest **40** of the dike **30** in the direction of flow arrow "b". This liquid, treated by the chemical composition of the tablet T then enters into the exit section **36** and flows outwardly through the exit **46** thereby exiting the cartridge-type dispenser **10**. Concurrently, any liquid, as indicated by flow arrows "c", which flows from the upper cavity **18** and through the channel **32** from the supply weir **24** enters the overflow weir **26** and cascades or flows downwardly through the overflow exit **58** wherein it flows into the exit section **36** and continues to flow out of the cartridge-type dispenser **10** via the exit **46**. The direction of this flow is indicated by the representation of flow arrow c. As can be seen, under such condition the liquid flow from within the interior of the trough **34** (b) can commingle with any excess liquid (c) to form a combined liquid stream exiting the cartridge-type dispenser **10**. Such a flow condition as depicted in FIG. **7** provides two benefits. First, by careful construction of the cartridge-type dispenser **10** and establishing the relative sizes of the various elements, and in particular the volumetric capacity as well as the height of the supply weir **24**, this size and/or number of supply holes **56** the supply and volumetric capacity of the trough **34** as well as the position, and size of the dike **30** and its crest **40** with relation to both the trough **34** and the supply weir **24**, an optimal or particularly preferred volumetric flow rate be established based upon a constant supply rate of a liquid to the interior of the supply weir **24**. Any excess or overflow will result in the conditions identified and depicted on FIG. **7** whereby any excess liquid being supplied to the upper cavity **18** merely flows through the channel **32** downwardly and ultimately out via the exit **46** of the cartridge-type dispenser **10**. An alternative, may be desired that controlled dilution of the treatment composition formed by contacting the liquid L coming into contact with the tablet T can also be produced wherein, the dimensions of the elements hereintofore described are established such that while simultaneously ensuring supply of a liquid into the interior of the trough **34** via the supply weir **24** and the supply hole **56**, that an excess of liquid always flows via the channel **32** and downwardly where in can commingle with a stream (b) of liquid treatment composition which is diluted by the liquid stream (c) when exiting the cartridge-type dispenser **10**.

Furthermore, while not depicted in any of the figures it is to be understood that the cartridge-type dispenser according to the invention may also reliably function even when a vast excess of liquid L is supplied to the upper cavity **18** such that it exceeds the volumetric flow illustrated in FIG. **7**. In such condition, while the top level LT overflows the top flange **22**, the cartridge-type dispenser **10** will continue to operate as described with respect to FIG. **7**, and any further excess liquid L merely flows over the margins of the flange **22** and away from the cartridge-type dispenser **10**. Such provides then a "fail-safe" type provision due to a fault in the liquid being supplied to the cartridge-type dispenser, a failure to properly install the cartridge-type dispenser, a misuser mishandling of the cartridge-type dispenser, or the like.

FIG. **8** depicts a schematic embodiment of a device utilizing the cartridge-type dispenser according to the present invention. As is seen on FIG. **8**, there provided a supplied liquid "LS" via a conduit **61** from a liquid supply source **60** which is upstream of the cartridge-type dispenser **10**. Any conduit, suitable for supplying a suitable quantity of the supplied liquid LS is used to provide a fluid-type connection between the liquid supply and the upper cavity **18** of the cartridge-type dispenser **10**. While not depicted it can be understood that any means, or device can be utilized to control the rate of liquid being supplied such as a valve, constricted flow point as part of the conduit and the like which can be at any point intermediate the liquid supply source **60** and the supply weir **24** of the cartridge-type dispenser **10**. Such means can be used to control or limit the flow and/or to completely terminate or to initiate the flow of the liquid being supplied LS. Downstream of the cartridge-type dispenser **10** is visible a collection means **63** which is placed downstream of the exit **46** of the cartridge-type dispenser **10**. The collection means **63** is used to merely collect the liquid treatment composition exiting the cartridge-type dispenser **10** and to supply it to a suitable liquid conduit **65** which can be used to deliver the liquid treatment composition at a point downstream. Any means, or device to provide these functions can be used and will be readily apparent to one skilled in the art.

Conveniently, the cartridge-type dispenser **10** is used in conjunction with a housing (not shown in FIG. **8**) which may include a pair of parallel slots or rails **64** which are dimensioned to suitably receive portions of the top and bottom flanges **22**, **44** which extend from at least one, but preferably both opposite sides S1, S2 of the cartridge-type dispenser **10**. Thereby, portions of the top and bottom flanges **22**, **44** may be conveniently inserted such as by sliding within the corresponding portions of the rails **64** (or slots) which can be used to position, as well as maintain the cartridge-type dispenser in a specific location with respect to a housing and/or a device utilizing the cartridge-type dispenser.

Further variation of the cartridge-type dispenser are described in the following figures and are considered to fall within the scope of the present inventive concept.

Depicted on FIG. **9** is a further embodiment of a cartridge-type dispenser **10** inserted within a portion of a housing **70** which may form an element of a larger device (not shown). As is seen therein, sides or edges of the top flange **22** and the bottom flange **44** are seen to rest within a slot **64** suitably dimensioned to accommodate these flange portions. As is further visible in FIG. **9**, the cartridge-type dispenser **10** is depicted in a cross-sectional view which approximately bisects the cartridge-type dispenser **10** between its front F and its rear R thus permitting a view of the interior arrangements of said cartridge-type dispenser. As is seen, the upper cavity **18** here is comprised only of the supply weir **24** and the overflow weir **26** as connected by intermediate channel **32**. In contrast to the prior embodiments illustrated in FIGS. **1-7**, there is no additional region which extends beneath the flange **22** towards the interior trough **34** of the cartridge-type dispenser **10**. Also visible is a tablet "T" placed within the interior of the trough **34**. As can be seen, the tablet T occupies a significant portion of the space rearward of the supply weir **24** and the tablet's upper surface TS is at least higher than the peak of the crest **40** of the dike **30**. It is also seen that in this cross-sectional view, that a retention post **28** has been omitted, and similarly, the retention wall **48** and retention pin **50** is also omitted as being unnecessary. As will be readily understood, the size of the tablet T is sufficient in that it is retained behind the supply weir **24** and does not require such additional elements in order to maintain it in its position.

Visible from FIG. **9** is a preferred embodiment of the invention wherein, the positioning of the cartridge-type dispenser **10** is at an incline with respect to a horizontal line, here represented by a line segment "H" such that the base **38** of the trough **34** is angled, as indicated by "α" approximately at least 2°, preferably at least 4° and most preferably at least 6° with respect to the horizontal when the cartridge-type dispenser **10** is utilized. Such a slight tilt in the orientation of the cartridge-type dispenser **10** is particularly advantageous in ensuring that fluid flow occurs under non-pressurized conditions. Of course, such is an optional feature and it is to be clearly understood that the cartridge-type dispenser may be used wherein the base of the trough **34** substantially parallel to the horizontal H.

The utilization of a housing depicted on FIG. **9** is a particularly convenient form for the utilization of the cartridge-type dispenser. The pair of slots **64** provide for a very convenient means whereby a user can insert and simultaneously, correctly position the cartridge-type dispenser **10** with respect to the apparatus within which it is used. Further, as is visible from FIG. **9**, the location of the hinge is advantageously positioned to extend beyond the margin of the housing **70** whereby it projects and provides a convenient means whereby a user can grasp the cartridge and either insert, or withdraw it without needing to touch further parts of the cartridge-type dispenser **10**.

The depiction of FIG. **9** also illustrates a further important embodiment of the invention. Whereas the prior embodiments had illustrated a chemical composition in the form of a tablet having a maximum height dimension with respect to the base **38** which was less than the height of the crest **40** from the base, FIG. **9** depicts the fact that such is not a limitation of the invention but merely a variation. FIG. **9** clearly shows the opposite, namely where the top surface TS of the tablet T is higher than the crest **40** of the dike **30** both being measured with respect to the base **30**.

It is also to be understood that whereas a tablet namely in the form of a compacted solid is depicted in this figure, that other solid or semi-solid forms of a chemical composition can be utilized in any of the embodiments of the invention. For example, although not shown in FIG. **9**, that the illustrated tablet T can in fact be a further cartridge, cage, container, or other dispenser for a solid, semi-solid or indeed for a liquid composition. For example, it is contemplated that a solid body may be used as depicted in FIG. **9**, or alternately a paste or a gel.

FIG. **10** depicts a second embodiment of a cartridge-type dispenser **10** according to the present invention. This embodiment includes many features common to the embodiment discussed with regard to FIGS. **1-8** yet includes several unique modifications which distinguish it from the first embodiment previously discussed.

As shown on FIG. **10**, the cartridge-type dispenser **10** includes an upper **18** which comprises a supply weir **24** and which further comprises two separate overflow weirs, a first overflow weir **26** and a second overflow weir **27**. Each of these overflow weirs **26**, **27** is connected to the supply weir **24** by a corresponding overflow channel **32**, **33**. As is very clearly visible from the figure, the first exit weir **26** is spaced apart from the second exit weir **27**, both being adjacent to the front F of the cartridge-type dispenser **10**, and divided by a recess **80** which extends downwardly from the top **12** and provides for an unencumbered vertical gap **82** between the first exit section **36** and a second exit section **37** which extend downwardly with respect to the top **12**. As can be readily understood from the figure, the position of the recess **80** provides for a vertical gap **82** and also acts to functionally divide the single overflow weir **26** and exit section **36** described with reference to FIGS. **1-9** into two similarly functional elements. Otherwise, it will be understood that the operation of the embodiment of the cartridge-type dispenser **10** depicted on FIG. **10** remains essentially the same as previously described albeit with the additional function provided by the recess **80**. Also depicted on FIG. **10** is a vent channel **84** which is positioned intermediate the top part **12** and the bottom part **14** of the cartridge-type dispenser and provides for air/liquid communication from the exterior of the cartridge-type dispenser **10**, and the interior of the exit section **37**.

Turning now to FIG. **11**, there is depicted in an unfolded configuration the second embodiment of the cartridge-type dispenser **10** described with reference to FIG. **10**. As is readily visible thereon, there is provided a retention post **28** extending downwardly from the top part **12** and extending inwardly into the interior of the trough **34** from the base **38** are three retention posts **28**A which are spaced apart from one another. While not clearly depicted in FIG. **10** or FIG. **11**, it is to be understood that the relative position of the retention posts **28** are suitably dimensioned to accept and to retain therebetween a suitably configured tablet T. Further visible from the figure are the exit **46** located at the bottom of the exit section **36** as well as the exit **47** located at the bottom of exit section **37**. Again, as described with references to prior figures, the exits **46**, **47** permit for the egress of any liquids exiting the cartridge-type dispenser to pass out through said exits **46**, **47** and to continue to any point downstream of the cartridge-type dispenser **10**. Additionally, a hinge **16** is also visible joining the top part **12** and the bottom part **14** of the cartridge-type dispenser **10**. When assembled, as depicted in FIG. **10**, corresponding portions, namely the top flange **22** is layered in register with the bottom flange **44** of the bottom part **14**. Advantageously, a liquid tight seal is formed at or between the surfaces of these flanges **22**, **44**. Again, as described with reference to FIG. **1-3**, the utilization of a hinge **16** adjoining the adjacent rearward edges of the top part **12** with the bottom part **14** provides for a convenient and generally reliable means for folding and positioning the top part with respect to the bottom part prior to, and/or during assembly of the cartridge-type dispenser **10**.

Turning now to FIG. **12**, there is shown a plan view of the top of the cartridge-type dispenser **10** of FIGS. **10**, **11**. As is seen thereon, the first overflow weir **26** includes an overflow exit **58** permitting for any liquid overflowing the channel **32** from the supply weir **24** to exit downwardly through the exit **58**. Similarly, there is depicted a second overflow weir **27** which includes an exit **59** at the base thereof. This second overflow weir **27** is similarly in fluid communication via the channel **33** with the supply weir **24**. A recess **80** in the top **12** separating the first exit weir **26** from the second exit weir **27** is visible and while the depiction shows that the top surface of the cartridge-type dispenser is essentially symmetrical about a line parallel to the first side **S1** and the second side **S2** passing through a mid-point between these two sides, such illustrates a preferred embodiment, but is not a limiting feature of the present invention.

FIG. **13** depicts a plan view of the underside of the cartridge-type dispenser **10** described with reference to FIGS. **10-12**. As is readily seen, a dike **30** separates the trough from the exit section **36** as well as the exit weir **37**. Also visible are the retention posts **28**A which extend upwardly from the base **38** into the interior of the trough (not shown).

FIG. **14** illustrates a cross-section of the second embodiment of the cartridge-type dispenser **10** according the FIG. **10** as bisected by a plane passing midway between the first side S**1** and the second side S**2** thereof. As can be seen in the detail provided within FIG. **14**, the cartridge-type dispenser **10** is formed with a top part **12** and a bottom part **14** which are conjoined at overlapping flanges **22**, **44** having a liquid-type seal formed therebetween. Extending upwardly from the base **38** and into the interior or trough **34** are a plurality of retention posts **28**A which are integrally formed with the base **38**. Extending downwardly from the top **12** is a retention post **28** which in conjunction with the retention posts **28**A is adapted to retain therebetween a treatment composition, here in the form of a tablet (depicted in phantom) T. Forward of the tablet T is a supply weir **24** integrally formed and extending downwardly from the top **12** having at its bottom a supply hole **56** through which a liquid present within the supply weir **24** may enter into the trough **34**. Further, while not clearly depicted in this particular cross-sectional view, a channel **32** permits for excess liquid present in the supply weir **24** to pass and enter into an overflow weir **26**.

Turning now to FIG. **15**, there is depicted a perspective cross-sectional view of the second embodiment of the cartridge-type dispenser **10** depicted and described with reference to FIGS. **10-14**. In this particular embodiment, the cross-sectional view is at a plane which intersects the cartridge-type dispenser and bisects exit weir **37**. With regard to the depiction, in this view a tablet T is omitted. As is nonetheless visible from the figure, the trough **34** is in fluid communication with the exit section **37** and its exit **47** whereby, liquid present within the trough **34** may pass over the crest **40** of the dike **30** and spill over into the exit section **37** and out through the exit **47**. Similarly, any liquid present in the supply weir **24** in excess of its volumetric capacity can also flow over and through the channel **32** into one or both of exit weirs **26**, **27** and flow downwardly and exit out from the cartridge-type dispenser **10**.

FIG. **16** illustrates in a perspective view a further cross-sectional view described with reference to FIG. **14**. Again, in this FIG. **15**, the tablet T has been omitted for sake of clarity as it has been omitted in the description regarding FIG. **15**. As is better visible in this view, a plurality of supply holes **56** is present at the bottom of the supply weir **24** which permits for the fluid communication of liquid in the supply weir **24** into the trough **34**. Again, any excess liquid present within the supply weir **24** may flow through the channel **32** connecting the upper portion of the supply weir **24** and overflow weir **26** wherein such excess liquid may flow downwardly and out of the cartridge-type dispenser **10** via the exit **46**.

FIG. **17** illustrates an embodiment of a housing body **90** which is adapted to receive and retain therein a cartridge-type dispenser **10** according to the second embodiment of the invention. As is visible therein, in this cross-sectional view a portion of the upper and bottom flanges **22**, **44** are slidably insertable via a recessed channel **64** present within the housing body **90**. As is readily seen, the base **38** of the cartridge-type dispenser **10** is positioned at an incline with respect to the horizontal "H" wherein the angle between the horizontal H and the base **38**, the angle "alpha" is desirably greater than 0°, it is desirably at least 2°, more preferably at least 4° with respect to the horizontal H. In this manner, a downward directional flow may be imparted wherein the housing body **90** is part of an apparatus, or is otherwise positioned so that its base **92** is essentially horizontal. The housing body **90** also includes an inlet port **94** which is above and upstream of the supply weir **24**. In this embodiment, a generally cylindrical inlet port or bore is disclosed however, such is a convenient form, but is not a required form of the inlet port **94**. The inlet port terminates in a spillway **96**, here in the form of a generally flat, or arcuate downwardly sloping ramp terminating at an end **100** which directs liquid entering from the fluid port **94** into the supply weir **24**. Thereafter, liquid supplied into the supply weir **24** enters into the interior of the cartridge-type dispenser **10** and operates in the manner described in the prior figures. The housing body **90** also includes a housing body exit **98** which is downstream of the cartridge-type dispenser **10** and is specially downstream of any liquid exits, here **46**.

FIG. **18** shows a cross-sectional view of the housing body **90** of FIG. **17** containing therein a cartridge-type dispenser **10** according to the second embodiment of the invention. As is seen therein in greater detail is the relationship between the inlet port **94**, the spillway **96**, the housing body exit **98** and the cartridge-type dispenser **10**. FIG. **18** depicts the cartridge-type dispenser **10** as being properly inserted. In this embodiment, any liquid (as indicted by flow directional arrows "f") flowing from the inlet port **94** pass down the spillway **96** past the end thereof **100**, and into the supply weir **24**. As can be seen, the cartridge-type dispenser is slightly inclined, at an angle "alpha" with respect to the horizontal "H" and as is depicted thereon, quality of liquid L is present both within the supply weir **24** as well as within the trough **34**. The level of the liquid, that is to say the top of the liquid "LT" as depicted in this particular embodiment, is seen to be sufficiently high to both cover the tablet "T" as well as to rise above the crest **40** whereby liquid containing a quantity of the chemical composition which has been provided by the tablet T forms a liquid treatment composition LC which exits via the exit section **46** past the dispenser body exit **98** and is permitted to float downstream. This liquid treatment composition can be used either directly, or can be passed further downstream to a further part of the apparatus as is appropriate.

Certain advantageous features of the dispenser body **90** and the cartridge-type dispenser **10** depicted on FIG. **18** are described in further detail with respect to FIGS. **19** and **20**.

Turning first to FIG. **19**, there is depicted thereon a cartridge-type dispenser **10** which has only been partially inserted within the dispenser body **90**. As can be seen, the front F of the cartridge-type dispenser **10** is positioned such that the end **100** of the spillway **96** is positioned above the recess **80** as well as above one or both of the overflow weirs. In this depiction, overflow weir **46** is disclosed; overflow weir may be present but is not visible in this cross-sectional view.

In operation, liquid entering the fluid inlet **94** passes down the face of the spillway **96** and falls beyond the end **100** thereof. This liquid is represented by directional arrows "f" in the figures. As can be seen, the liquid falls directly downwardly and either falls through the recess **80** and in the gap **82** and then onto a raceway **102** beneath the cartridge-type dispenser **100**, and/or alternately, may fall through one or both of the exit weirs **46** (as well as **47**) and thereupon onto the raceway **102**. As will be understood with reference to the figure, liquid does not enter into the trough **34** of the cartridge-type dispenser **34** nor come into contact with the chemical composition, here depicted as a tablet T. Rather, the liquid falls onto the raceway **102** and in accordance with the depicted embodiment, the raceway is slightly tilted downwardly and away from the dispenser body exit **98**. In such configuration, the liquid then rolls or spills outwardly from the dispenser type body and does not pass further downstream via the dispenser body exit **98**.

Turning now to FIG. **20**, there is depicted a still further arrangement of the dispenser body according to FIGS. **18** and **19** as well as the dispensing type cartridge **10**. In the configuration depicted, the dispensing cartridge **10** is even further withdrawn away from the interior of the dispenser body **90** such that the front end F of the cartridge-type dispenser **10** does not extend beneath the spillway **96** or its front end **100** thereof. In the embodiment as depicted, liquid entering via the fluid inlet **94** passes onto the spillway **96** and falls downwardly over the end **100** thereof. As the cartridge-type dispenser **100** is retracted with respect to the dispenser body **90**, this flow of liquid "f" falls directly downwardly without contacting any part of the dispenser cartridge **100** but flows directly by impinging onto the raceway **102**. As is shown in the picture, directional arrows "f" indicate the direction of flow of this liquid. As is seen, the liquid is directed to flow outwardly and away from the dispenser body **90** and not further downstream by exiting via the dispenser body exit **98**.

With respect to the embodiments of FIGS. **18**, **19** and **20**, it is of course to be understood that certain variations are clearly contemplated to fall within the scope of the invention.

First, it is contemplated that the angle of the base of the dispenser cartridge **10** does not necessarily need to be angled with respect to the horizontal, in such case the angle "α" may be zero, or for that matter may even be a negative angle with respect to the horizontal.

With regard to the dimensions of the raceway, it is contemplated that where it is desired that all liquid be reclaimed, irregardless of the proper or improper orientation or positioning of the cartridge-type dispenser **10** with respect to the dispenser body **90**, that, the raceway may be altered so that it is tilted to direct any liquid flow "f" inwardly towards the dispenser body exit **98**, and thereafter thus directing such liquid further downstream. It is also further contemplated that the relative size of the dispenser body exit **98** may be enlarged so as to reduce, or eliminate the need for a raceway **102** as depicted in FIGS. **18**, **19** and **20**.

It is also clearly contemplated that different embodiments of cartridge-type dispensers, including the first embodiment previously discussed, as well as the third embodiment to be discussed hereinafter may also so be utilized with the dispenser body disclosed in FIGS. **17-20** according to the present invention.

FIGS. **21**, **22**, **23**, **24** illustrate a third, preferred embodiment of a cartridge-type dispenser **10** according to the present invention.

Turning now to FIG. **21**, there is depicted a cartridge-type dispenser **10** which includes a top part **12** joined to a bottom part **14** via corresponding peripheral flanges **22**, **44**. The top portion is affixed to the second portion also by an intermediate hinge **16** positioned at the rear "R" of the cartridge-type dispenser **10**. At the opposite end thereof, namely the front "F" and the cartridge-type dispenser **10** is provided intermediate a portion of the top flange **22** and the bottom flange **44** and overflow passage **110** which provides for fluid communication between the interior and the exterior of the cartridge-type dispenser **10**. Moving from the front F towards the rear R of the cartridge-type dispenser there is provided an overflow channel **112** which is in fluid communication with a supply weir **24**. The overflow channel has a crest portion **124** positioned between two side abutments **126** and **128** which are used to direct flow of any excess liquid present within the supply weir **24** between aforesaid abutments **126**, **128** and through the overflow channel **112** outwardly and away from the cartridge-type dispenser **10**. Still further rearwardly with respect to the front of the device, and between the supply weir **24** and the hinge **16** there are present a pair of spaced apart ramped support ridges **130**, **132**. Each of the aforesaid ramp ridges include a forwardly directed ramp portion **134**, **136** which rise upward from the top surface of the cartridge-type dispenser **10** and which terminate in a corresponding detent, here an arcuate detent **138**, **140** which is present on and forms a part of each of the ramped support ridges **130**, **132**. Also visible in the figure, is indicated a retention post **28** which extends downwardly from the top surface of the cartridge-type dispenser **10** and although not shown, extends inwardly into the interior thereof.

With respect now to the bottom of the cartridge-type dispenser **10** of FIG. **21**, there is visible a single exit section **36** which has at its bottom end thereof (not visible in the figure) an exit **46**. Rearward of the exit section **36** is positioned a dike **30** having a crest **40** which separates the rearward or trough **34** of the bottom part of the cartridge-type dispenser from the exit section **36**.

Turning now to FIG. **22**, there is depicted a top plan view of the cartridge-type dispenser according to FIG. **21**. As is visible thereon, the supply weir **24** has at its bottom a supply hole **56** which permits for liquid present within the supply weir **24** to pass into the interior of the cartridge-type dispenser **10**.

Turning now to FIG. **23**, there is depicted a side, plan view of the cartridge-type dispenser **10** according the FIGS. **21**, **22**. As is visible thereon, the top part **12** and the bottom part **14** of the cartridge-type dispenser **10** are sealed together in a liquid tight bond at their appropriate flanges **22**, **44** which extend about the periphery of the cartridge-type dispenser **10**.

FIG. **24** illustrates across-sectional view of the cartridge-type dispenser according to FIGS. **21**, **22**. The cross-sectional view depicted on FIG. **24** is in accordance with the plane bisecting the cartridge according to FIG. **23** and parallel thereto. As is better seen in FIG. **24**, the interior of the cartridge-type dispenser **10** more clearly depicts the arrangements of the various elements forming a part thereof. Moving from the front F towards the rear R is first to be noted that the exit **46** of the exit section **36** is actually provided by a plurality of spaced apart perforations, here circular holes which pass through the material of construction making up the bottom of the cartridge-type dispenser **10**. These perforations forming the exit **46** are positioned at the base of the exit section **36**. The bottom of the supply weir **24** terminates in a supply hole **56** which provides for liquid to pass from the interior of the supply weir **24** and into the interior of the trough **34** of the cartridge-type dispenser **10**. In this embodiment, the chemical treatment composition is depicted as provided in the form of a compressed tablet "T" as depicted. Rearward of both the supply weir **24** and the cartridge-type dispenser T is a retaining post **28** which extends downwardly from the top, of the cartridge-type dispenser and into the interior thereof. In this particular embodiment, such a retaining post **28** is optional albeit, may be retained particularly where tablets of larger dimensions are contemplated to be use, and/or the tablet is intended to be positioned between a retaining post **28**A (partially visible) and beneath the retaining post **28**. As is further visible in the figure, the overflow channel **124** is in fluid communication with one edge of the supply weir **24** and extends towards the front of the cartridge-type dispenser **10**. Finally, there is visible the interior of the overflow conduit **110** positioned between a part of the upper flange **20** and the bottom flange **44** in providing for fluid communication into the interior of the cartridge-type dispenser **10**. The third embodiment of the cartridge-type dispenser according to FIGS. **21-24** are advantageously used with a dispenser body as described with reference to FIGS. **25-27**. The embodiment depicted in these figures illustrates a third preferred embodiment of a dispenser body **150** according to the present invention.

With reference now to FIG. **25** as is seen thereon, the dispenser body **150** includes a liquid inlet **94** which is a bore passing from the interior and into the interior of the dispenser body **150**. The dispenser body in the embodiment depicted includes a valve **160** mounted upon a cantilever arm **162** having one end a pivot **164** which is inserted into a corresponding retainer or hole (not shown) within the dispenser body **150**. Adjacent to the pivot end **164** is the valve **160** which advantageously includes at least a part **166** which is resilient and which can be used to form a liquid tight seal by abutting a portion thereof against end **168** of the bore **94**. The cantilever arm **162** has at its terminal end **170** a curved end **172** and the mass of the cantilever arm **162** and its position with respect to the valve **160** and the pivot end **164** is such that, when a cartridge-type dispenser **10** according to the invention is absent from the interior of the dispenser body **150**, or is insufficiently inserted within the interior of the dispenser body, the mass of the cantilever arm **162** is sufficient such that the valve **160** is urged against the end **168** of the bore and to provide a liquid tight seal therewith. In this manner, liquid flow from the bore **94** into the interior of the dispenser body **150** is denied until a suitably dimensioned dispenser cartridge **10** according to the invention is properly inserted within the dispenser body **150**.

The dispenser body further includes a spillway **96** beyond the bore end **168** with the spillway **96** having an end **100** over which liquid exiting the bore **94** may flow. Also present within the dispenser body **150** are a pair of spaced apart channels **64** which are suitably dimensioned to accommodate a portion of the flanges of the cartridge-type dispenser **10** which is insertable therein. Further present, is a raceway **102** and a container body exit **98**.

It is to be pointed out that the arrangement of the spillway **96** and its end **100** with respect to the dimensions of the dispenser body exit **98** and the raceway **102** are approximately the same as that as depicted in prior FIGS. **19** and **20**. It is to be clearly understood that the end **100** of the spillway **96** overlaps and extends over the spillway **102**. However, as discussed previously, this is not necessary nor is to be construed as a limiting factor of the present invention and other configurations are clearly contemplated as falling within the scope of the present invention.

The operation and the interaction of the dispenser body **150** and the cartridge-type dispenser **10** according to the third embodiment of the invention is described and disclosed in better detail with regard to FIG. **26**. As is therein clearly visible, the properly inserted cartridge-type dispenser **10** is inserted within the channel **64** such that the cantilever arm **162** is urged upwardly and away from the top of the cartridge-type dispenser **10** and additionally, wherein the curved end **172** rests within the arcuate detents **138**, (not visible) **140**. This arrangement urges the valve **160** to be retracted whereby liquid may flow from within the bore **94** onto the spillway **96** past the end thereof and into the supply weir **24**. Thereafter, liquid may enter via the supply hole **56** into the trough **34** and come into contact with the chemical composition of the tablet T. The top surface or top level of the liquid "LT" extends from the rear of the cartridge to the crest **40**. The liquid, in which a part of the chemical composition dispersed, dissolved, or otherwise eluted into the liquid forms a treatment liquid composition "LC" which can then flow over the crest **40** downwardly into the exit section **36** and downstream via the exit, **46**, here one of more of a plurality of holes provided for that function.

Again, as has been discussed with reference to prior figures, the position of the base **38** of the cartridge-type dispenser **10** is positioned at an angle "alpha" which is greater than zero with respect to the horizontal "H". However, this is not essential, albeit does represent a preferred embodiment of the invention.

FIG. **27** depicts in perspective view, the embodiment according to the figure represented in FIG. **26**. As can be seen from this perspective, cross-sectional embodiment, the various interrelationship of the specific elements discussed with reference to FIG. **26** are more clearly illustrated. Particularly, it is also readily seen that the exit **46** of the cartridge-type dispenser **10** is comprised of a plurality of spaced apart perforations or holes which pass through a portion of the bottom of the cartridge-type dispenser **10**.

While the foregoing figures illustrate certain preferred embodiments of the invention, it is nonetheless to be understood that many variations to the above embodiments may be made by a skilled artisan and such are considered to fall within the scope of the present invention. By way of non-limiting example such variations include: providing a screen or filter as a part of the top of the cartridge-type dispenser; providing a screen or filter in the supply weir of the cartridge-type dispenser; providing a single, or more than two ramped support ridges. Other obvious modifications may incorporated into the design or use of the cartridge-type dispensers of the invention as well as housings therefore and uses thereof and are considered to be part of the present invention.

While the cartridge-type dispenser may be made of any material, the use of non-porous materials such as metals, metallic foils, glass, ceramics, or thermosettable or thermoformable synthetic polymers such as are widely used in casting or injection molding may be used. The use of thermosetting polymers are particularly preferred as they are readily available and are easily formed into the cartridge-type dispensers by known techniques, including injection molding and vacuum molding.

The interior surfaces of the cartridge-type dispensers may be provided with a hydrophobic coating when water is to be used as the liquid, or with a hydrophilic coating when other liquids are to be used.

The cartridge-type dispensers of the invention include a chemical treatment composition, most conveniently present in the form of a gel, tablet or block.

The chemical treatment composition of the invention may by any composition or material which is at least partially soluble or dispersible in a liquid, e.g., water, non-aqueous liquid or mixture thereof which contacts the chemical treatment composition. It is to be understood that the chemical treatment composition need not be completely soluble or dispersible, rather it being sufficient that only a part is soluble in the liquid being supplied to the cartridge-type dispenser. The dissolution conditions, e.g., temperature, or rate of dissolution is not a limiting factor of the present invention and it is contemplated that the improved cartridge-type dispenser may be used with very poorly soluble materials, as well as very highly soluble materials as well.

The chemical treatment composition of the invention may be in the form of tablets and blocks useful in eluting one or more chemical compositions and which is useful with the cartridge-type dispenser described herein may be of any configuration or geometry; e.g., including but not limited to circular tablets, spheres, elliptical or oval shaped tablets, square, rectangular, parallelogram as well as cube shaped and brick shaped tablets. Also useful as tablets or blocks useful with the present inventions are configurations such as rods and rectangular plates which are at least twice as long as they are wide.

The chemical treatment composition of the invention may be it the form of a thickened past, or may be in the form of a gel, or indeed the chemical treatment composition may be a liquid composition provided in a carrier, such as a in a further container suitably dimensioned to fit within the interior of the trough of the cartridge-type dispenser. Such a liquid may be in a container which is made completely of, or alternately may be partially of a membrane material present within a wall portion of the container. In such an embodiment, liquid entering the cartridge-type dispenser contacts the membrane through which the liquid composition may elute into the liquid contained within the cartridge-type dispenser prior to flowing out from the said dispenser. Alternately the liquid of a chemical treatment composition may be absorbed or adsorbed onto a carrier substrate, such as in the form of a disperse matrix present in a continuous matrix wherein the latter is soluble in the liquid being supplied to the cartridge-type dispenser. In such an embodiment, as the continuous matrix is dispersed or dissolved, the particles of the disperse matrix are disposed and thereby release the chemical treatment composition to the liquid contacting the disperse matrix. Alternately the particles of the disperse matrix are merely physically entrained in the liquid but are not necessarily soluble or dispersible within the liquid.

It is contemplated that virtually any material may be used as the chemical treatment composition according to the invention.

By way of non-limiting examples the chemical treatment composition may comprise one or more the following: surfactants including one or more of anionic, cationic, nonionic, amphoteric and zwitterionic surfactants, disinfectants, sanitizing agents or compositions, coloring agents such as dyestuffs and pigments, fragrances, organic and inorganic salts particularly as may be useful in the treatment of water, such as hard water, enzymes, anti-corrosion agents, as well as others materials which may be useful in providing a benefit.

In certain embodiments the chemical treatment composition may comprise one or more of a pesticide, fungicide, insecticide, nematocide or herbicide.

In further embodiments the chemical treatment composition may comprise at least one pharmaceutically active constituent.

Advantageously wherein a disinfecting or sanitizing benefit is to be provided, the chemical treatment compositions comprise one or more known art sanitizers, such as alkali metal and alkaline earth metal hypochlorites, substituted and un-substituted chlorinated hydantoins, substituted and unsubstituted chlorinated isocyanurates and isocyanuric acids, substituted and unsubstituted chlorinated glycolurils, substituted and un-substituted chlorinated oxazolidinones and imidazolidinones and like chlorinated substances. Further exemplary sanitizing compositions are materials which provide hypohalous acid, HOX or hypohalite ion, OX^- species wherein X is halogen when dissolved in water. The halogen source may comprise any halogen or a combination thereof; chlorine and bromine ions are particularly useful. Representative sanitizing compositions which provide hypohalous acid sources include, inter alia, trichloroisocyanuric acid (TCCA), dichloroisocyanuric acid (DCCA), monochloroisocyanuric acid, potassium dichloroisocyanuric acid, sodium dichloroisocyanuric acid dihydrate, anhydrous sodium dichloroisocyanuric acid, tribromoisocyanuric acid, dibromoisocyanuric acid, monobromoisocyanuric acid, monobromo-dichlorochloroisocyanuric acid, dibromo-monochloroisocyanuric acid, calcium hypochlorite, lithium hypochlorite, 1,3-dichloro-5,5-dimethylhydantoin (DCDMH), 1,3-dibromo 5,5-dimethylhydantoin, 1-bromo, 3-chloro-5,5-dimethyhydantoin (BCDMH), 1,3-dichloro-5-methyl-5-ethylhydantoin, 1,3-dichloro-5,5-dimethyl-hydantoin, and the like.

Yet other devices which may incorporate the dispenser according to the invention, although not described with particularly within are also considered to be useful and falling into the scope of the invention.

It is to be understood that these examples are provided by way of illustration only and that further useful formulations falling within the scope of the present invention and the claims may be readily produced by one skilled in the art without deviating from the scope and spirit of the invention.

The invention claimed is:

1. A cartridge-type dispenser for a chemical treatment composition for eluting one or more chemical compounds via dissolution or dispersion of said chemical compound contained in said dispenser when contacted with water or other liquid to form a liquid treatment composition therefrom, the said dispenser including:

a top part joined to a bottom part, wherein the top part includes a supply weir having a supply hole, and wherein the supply weir is in fluid communication via an overflow channel with an overflow weir;

the bottom part includes a base having upwardly extending therefrom a dike which extends across the base and divides the base into a trough section and an exit section which exit section comprises an exit; and,

a chemical composition contained in the trough section.

2. A cartridge-type dispenser according to claim **1** wherein the top part further includes a retention post which extends into the bottom part.

3. A cartridge-type dispenser according to claim **1** wherein the chemical composition contained in the trough section is in the form of solid, gel, semi-solid or paste composition.

4. A cartridge-type dispenser according claim **3** wherein the chemical composition is in the form of a tablet.

5. A cartridge-type dispenser according to claim **1** wherein the chemical composition is at least partially dissolvable or dispersible in a liquid entering the cartridge-type dispenser.

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